

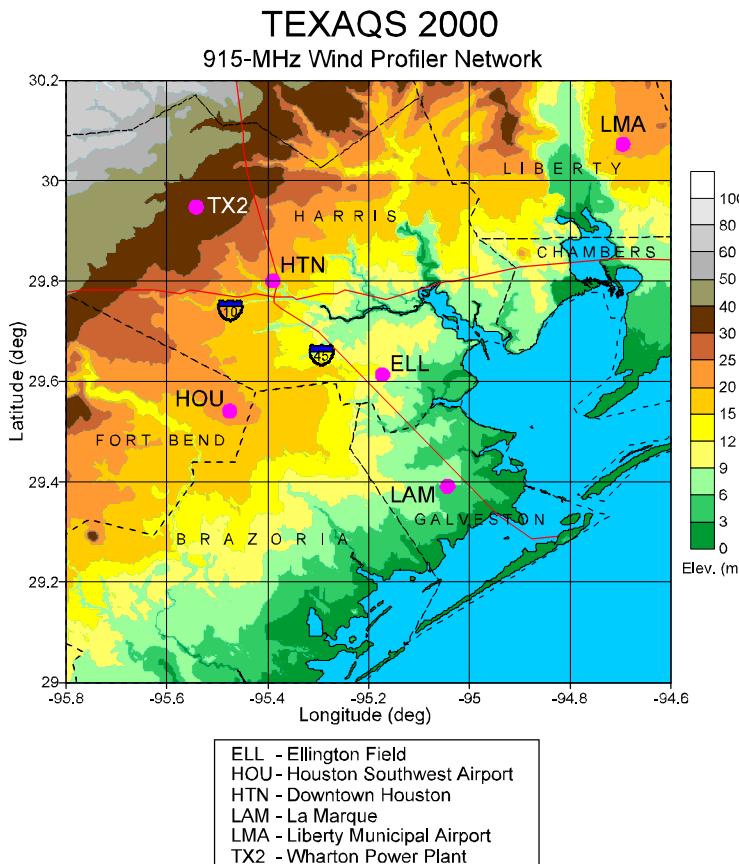
# TEXAQS-2000 Wind Profiler and GPS Sounding Quality Control

Final report to Texas Natural Resource Conservation Commission

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## 1. Introduction

During TEXAQS-2000, 915-MHz Doppler wind profilers were operated at six stations in and surrounding Houston, Texas. In addition, atmospheric soundings were obtained using a global-positioning-system (GPS) rawinsonde system that was collocated with the wind profiler at the Wharton Power Plant. The map below shows the locations of the wind profilers and rawinsonde system deployed during the field study. This report summarizes the steps taken to provide quality controlled wind profiler and rawinsonde datasets. Following descriptions of the editing procedures, plots of the data are given in the appendices.



## **2. Wind profiler editing**

Although traditional signal-processing methods are designed to remove unwanted non-atmospheric signals in the Doppler velocity spectra produced by wind profilers, there are still contaminated spectral signals that produce erroneous wind data. Quality control algorithms are implemented to identify and remove these erroneous data that would otherwise render inaccurate meteorological measurements and interpretation. NOAA/ETL currently uses a continuity method developed by Weber et al. (1993) to identify and preserve only those measurements that exhibit consistency in height and time.

The continuity method is based on the fundamental assumption that some valid data are present in a specified time-height domain. The degree of continuity of an individual data point is established by comparing its data value with the value interpolated from neighboring data points. A data value is considered discontinuous with its neighbors if the comparison exceeds a prescribed threshold. The size of the domain used in the interpolation typically consists of two neighboring heights above and below and two neighboring times before and after. A linear least-squares interpolation is used to increase the tolerance for large slopes in the data. Therefore, meteorological features of interest, such as shears and accelerations in the wind field and temperature gradients in the vicinity of fronts, are determined to be continuous.

Because erroneous measurements can also exist in the form of continuous time-height clusters, the point-continuity test can fail to identify erroneous data values at individual data points whose comparison domains lie completely within the erroneous cluster. To combat this potential problem, the continuity algorithm uses pattern recognition to identify erroneous data clusters. Patterns in a data set are formed by identifying subsets of data that are continuously connected. Neighboring points with similar values are placed in the same branch of some pattern. Additional branches are identified when neighboring points have different values. These branches may be part of the same pattern or may belong to completely different patterns. After all of the patterns in the data set have been recognized, a series of continuity tests are performed to identify discontinuities between the different branches while attempting to preserve the largest pattern size.

These methods have produced high quality results under a variety of meteorological conditions over many months of observations (Weber et al., 1993). Nevertheless, certain types of contamination, such as ground clutter, sea clutter, and migrating birds, can persist over time with consistent Doppler shift over many heights. In these situations, the continuity method can produce undesirable results. The major source of contamination identified in the TEXAQS-2000 wind profiler datasets, with the exception of the downtown site, was migrating birds. The downtown site was also subject to severe radio frequency interference (RFI). The major thrust of the wind profiler editing portion of this project was to remove wind data contaminated by migrating birds or RFI.

An algorithm was written that allowed the graphical display of wind profiler six minute moment data, and, through visual inspection of the velocity, reflectivity, and spectral width, contaminated data were identified from both the high and low resolution wind profiler modes. On those graphs, boxes were digitized around contaminated data, and the coordinates of the boxes were saved to a file. Another algorithm was written that used the coordinates of the

digitized boxes to remove contaminants from the moment level data. RFI was removed using the same method of visual inspection used to remove the bird-contaminated data. Uncontaminated data remaining from the original moments data were subjected to the continuity method (Weber et al., 1993). The visual removal of bird- and RFI-contaminated data preceded application of the continuity method so that uncontaminated data were not influenced by contaminated data. Thus, our intention was for the continuity method to lock onto patterns representing true atmospheric signals during its time and height continuity check.

After applying the continuity method, additional screening was performed. This “post processing” involved viewing and editing the hourly data graphically, using Sonoma Technology, Inc.’s LAPGraph software to remove outliers remaining after the previous methods described above had been applied. At this step in the processing, individual data points were scrutinized subjectively against those surrounding it in both time and height. The data were viewed for both speed and directional inconsistencies. After data processing, wind profiles were plotted for each day at each site for each of the wind profiler modes (see Appendix I).

### **3. Rawinsonde editing**

Students from Texas A&M University launched Vaisala rawinsondes (Model RS-80G) throughout the TEXAQS-2000 study period. Because the soundings were obtained from a commercial rawinsonde system, they did not require extreme quality control editing. Our intention here was to remove interpolated data (i.e., interpolated by the sounding data acquisition system) as well as obvious outliers. Also, because users of these soundings were unlikely to need full 1-s resolution, the sounding data were interpolated to 10-mb resolution. Sounding plots are given in Appendix II. The following steps were taken in the rawinsonde editing:

- 1) All interpolated (as determined by the sonde processor) data in the lowest 200 m were marked as invalid.
- 2) All regions of 10 or more consecutive heights of interpolated data above 200 were marked as invalid.
- 3) All invalid data (spikes) determined by manual inspection were removed.
- 4) Data were smoothed using a 9-point (in height) median filter.
- 5) Smoothed data were interpolated to 10 mb resolution.

#### **4. References**

Weber, B.L., D.B. Wuertz, D.C., Welsh, and R. McPeak, 1993: Quality controls for profiler measurements of winds and RASS temperatures. *J. Atmos. Oceanic Technol.*, **10**, 452-464.

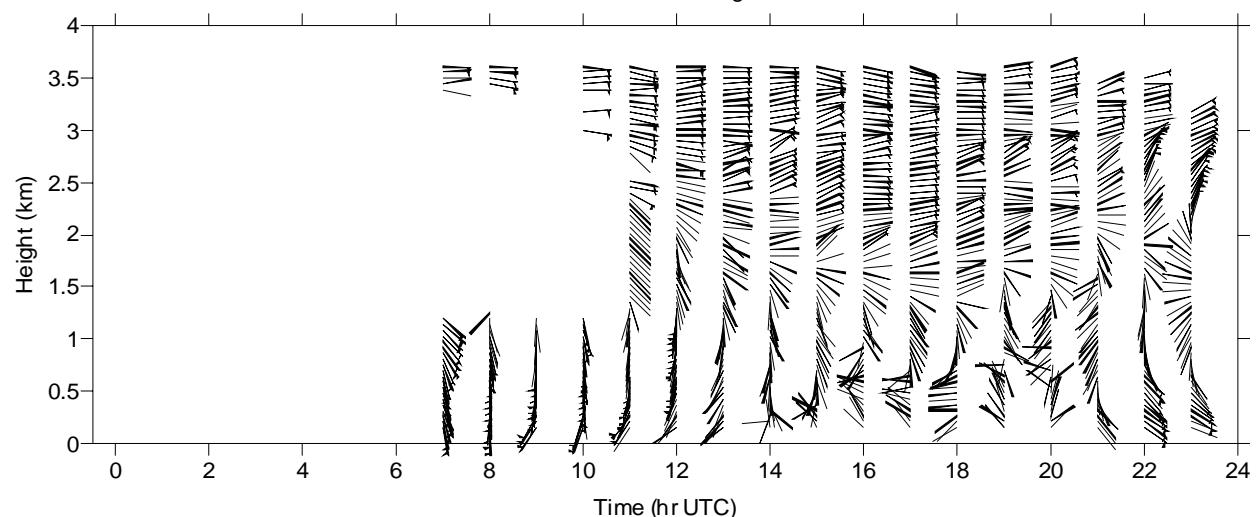
## Appendix I.

The table below lists wind profiler data availability from each profiler site and each profiler pulse resolution (e.g., 400 NS, where NS = nanoseconds). Daily plots of the edited wind profiles from each wind profiler site follow the table. In order to conserve space, more than one day may appear on a single page.

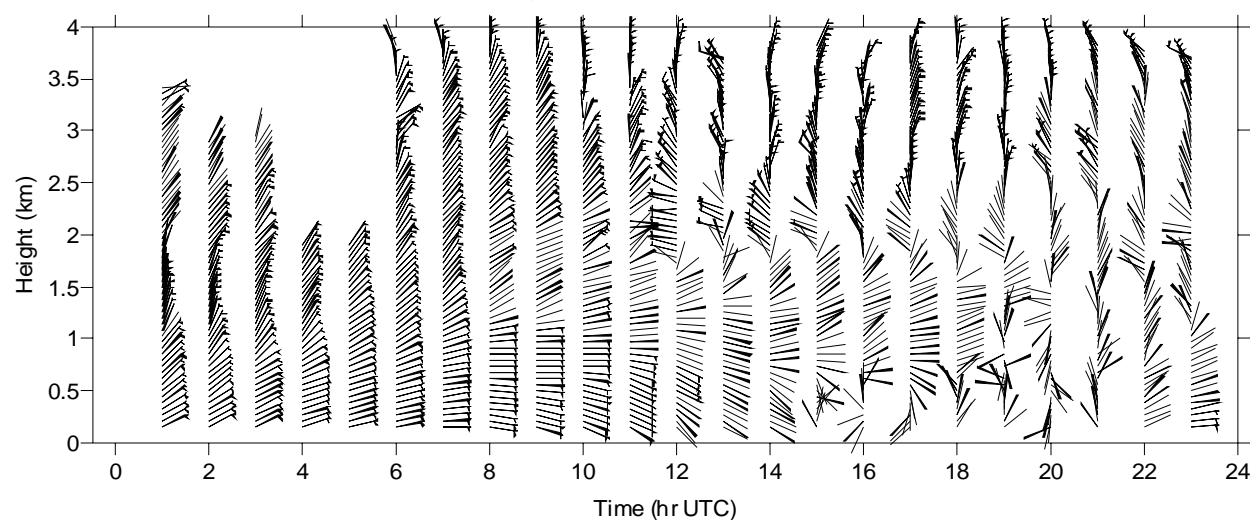
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Aug. 10	X	X				X		
Aug. 11	X	X				X		
Aug. 12	X	X				X		
Aug. 13	X	X		X	X	X		
Aug. 14		X		X	X	X		
Aug. 15		X		X	X	X		
Aug. 16		X		X	X	X		
Aug. 17		X		X	X	X	X	X
Aug. 18		X		X	X	X	X	X
Aug. 19		X		X	X	X	X	X
Aug. 20	X	X		X	X		X	X
Aug. 21		X		X	X	X	X	X
Aug. 22	X	X		X	X	X	X	X
Aug. 23	X	X		X	X	X	X	X
Aug. 24	X	X		X	X	X	X	X
Aug. 25	X	X		X	X	X	X	X
Aug. 26	X	X		X	X		X	X
Aug. 27	X	X		X	X	X	X	X
Aug. 28	X	X		X	X	X	X	X
Aug. 29	X	X		X	X	X	X	X
Aug. 30	X	X	X	X	X	X	X	X
Aug. 31	X	X	X	X	X	X	X	X
Sept. 1	X	X	X	X	X	X	X	X
Sept. 2	X	X	X	X	X	X	X	X
Sept. 3	X	X	X	X	X	X	X	X
Sept. 4	X	X	X	X	X	X	X	X
Sept. 5	X	X	X	X	X	X	X	X
Sept. 6	X	X	X	X	X	X	X	X
Sept. 7	X	X	X	X	X	X	X	X
Sept. 8	X	X	X	X	X	X	X	X
Sept. 9	X	X	X	X	X	X	X	X
Sept. 10	X	X	X	X	X	X	X	X

Sept. 11	X	X	X	X	X	X	X	X
Sept. 12	X	X	X	X	X	X	X	X
Sept. 13	X	X	X	X	X	X	X	X
Sept. 14	X	X	X	X	X	X	X	X
Sept. 15	X	X	X	X	X	X	X	X
Sept. 16		X	X	X	X	X	X	X
Sept. 17	X	X	X	X	X			
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Sept. 19	X	X		X	X			
Sept. 20	X	X		X	X			
Sept. 21	X							

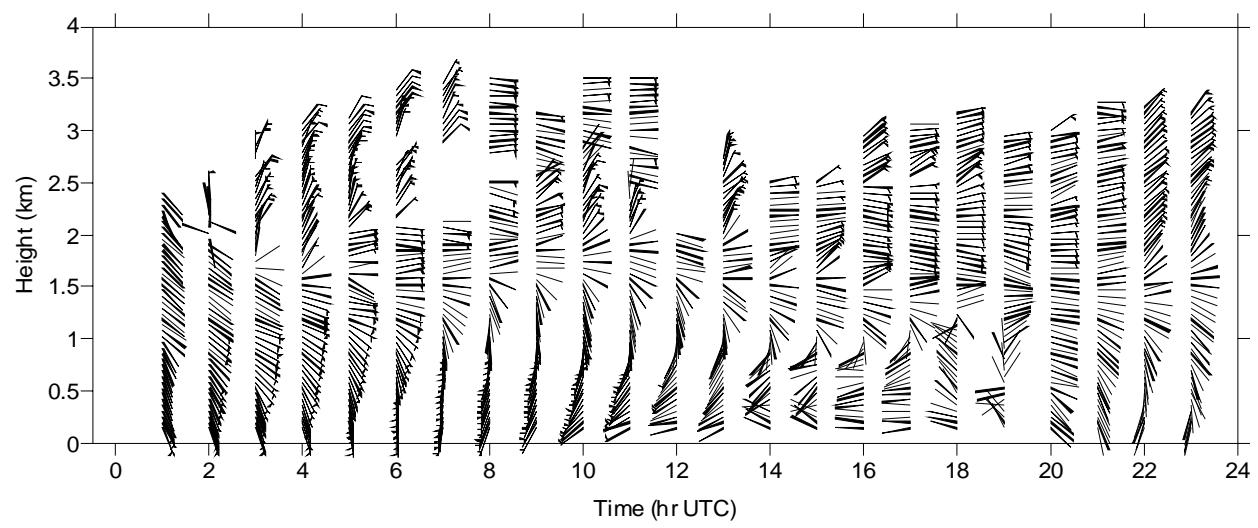
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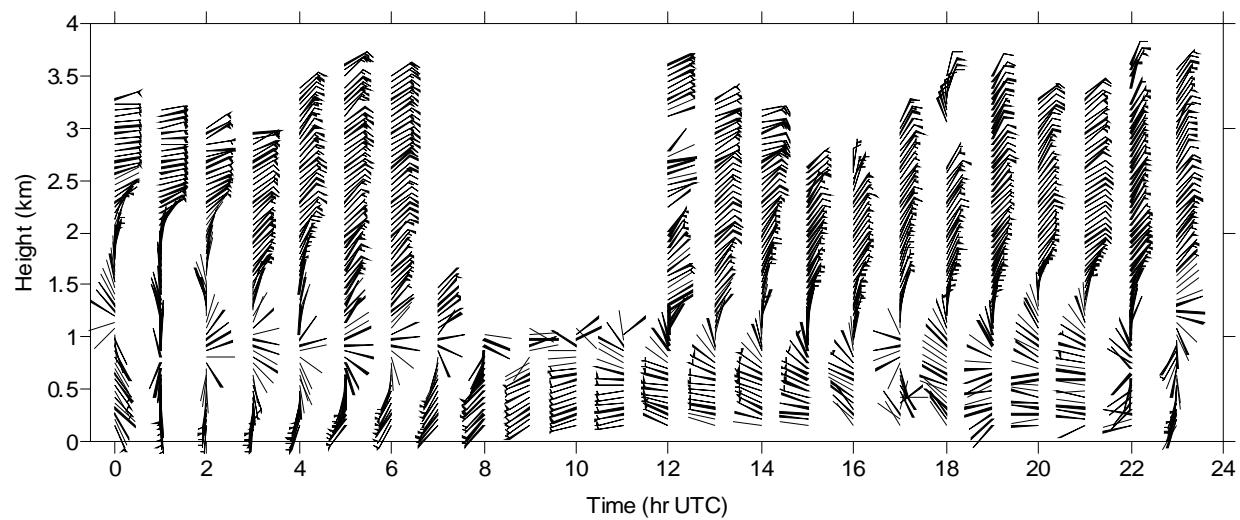
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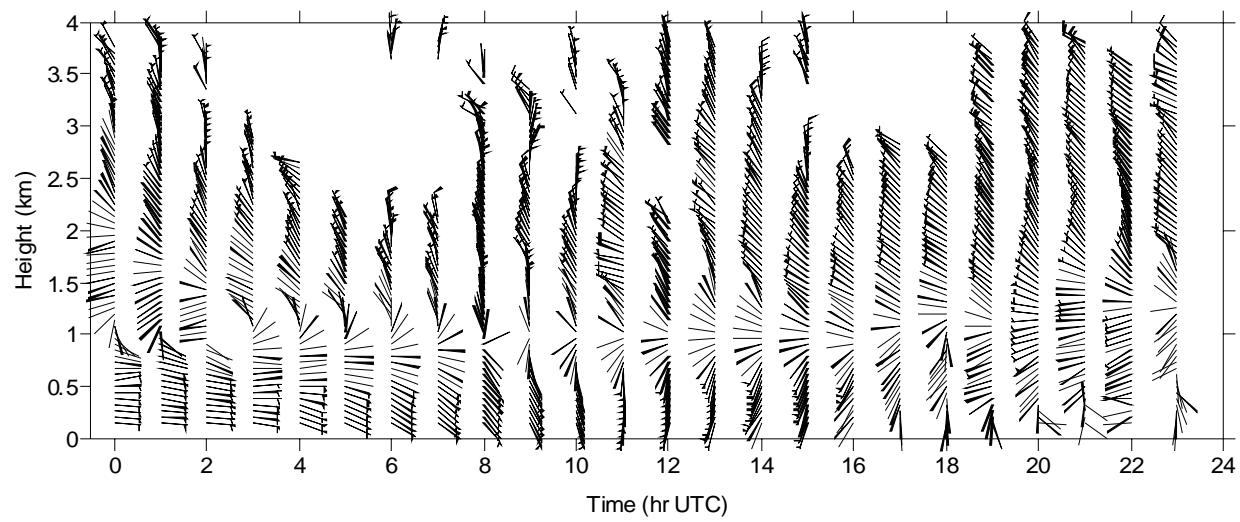
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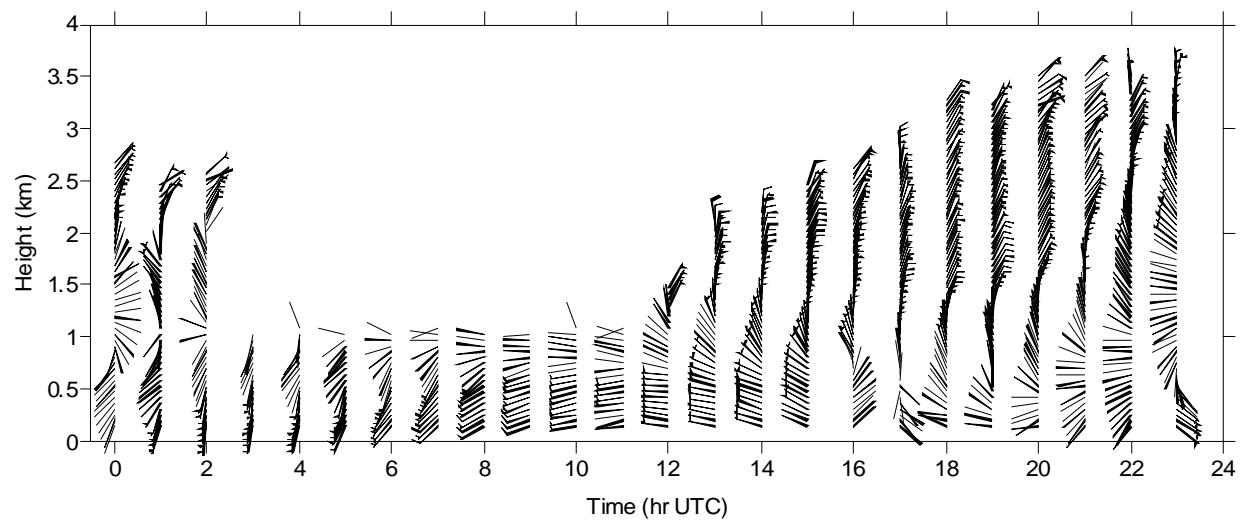
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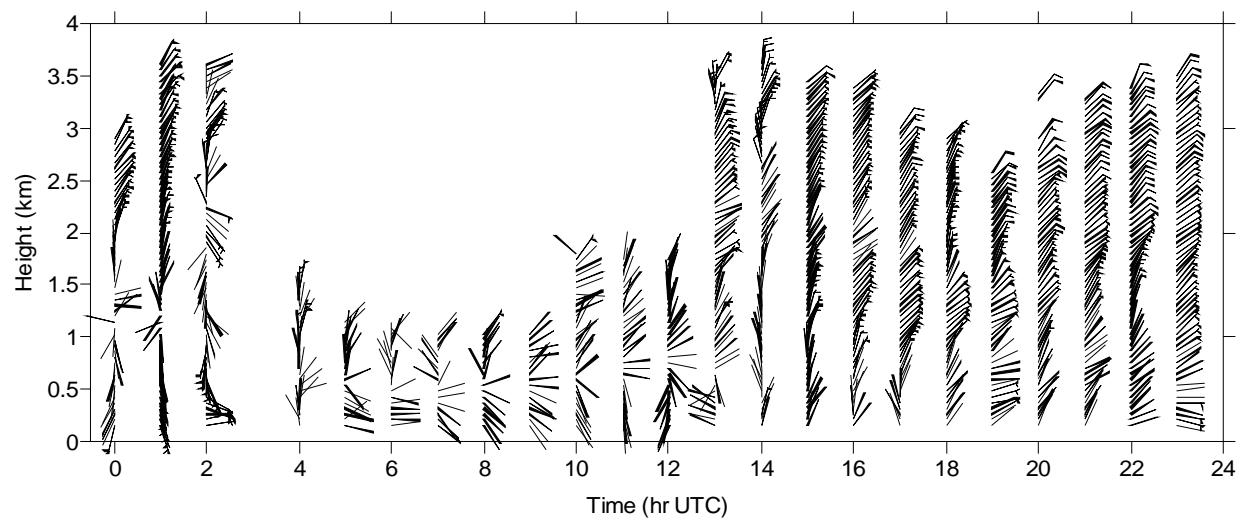
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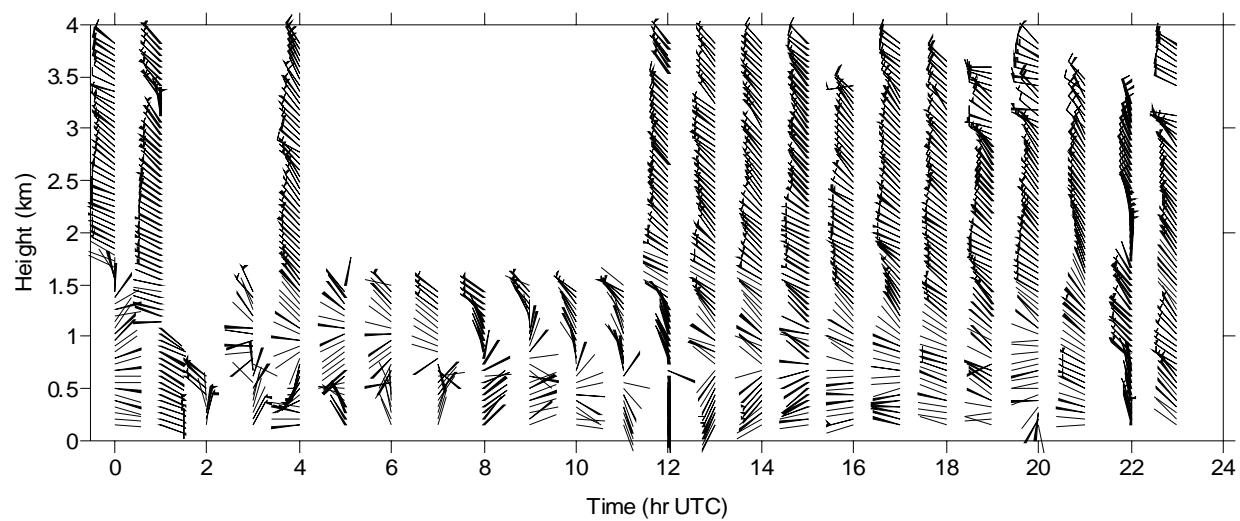
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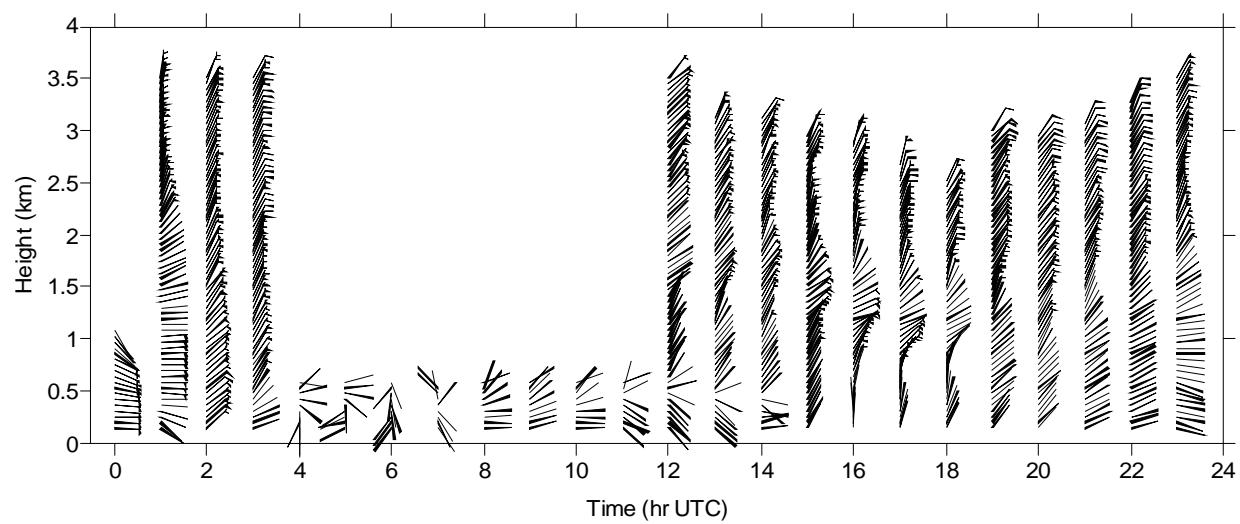
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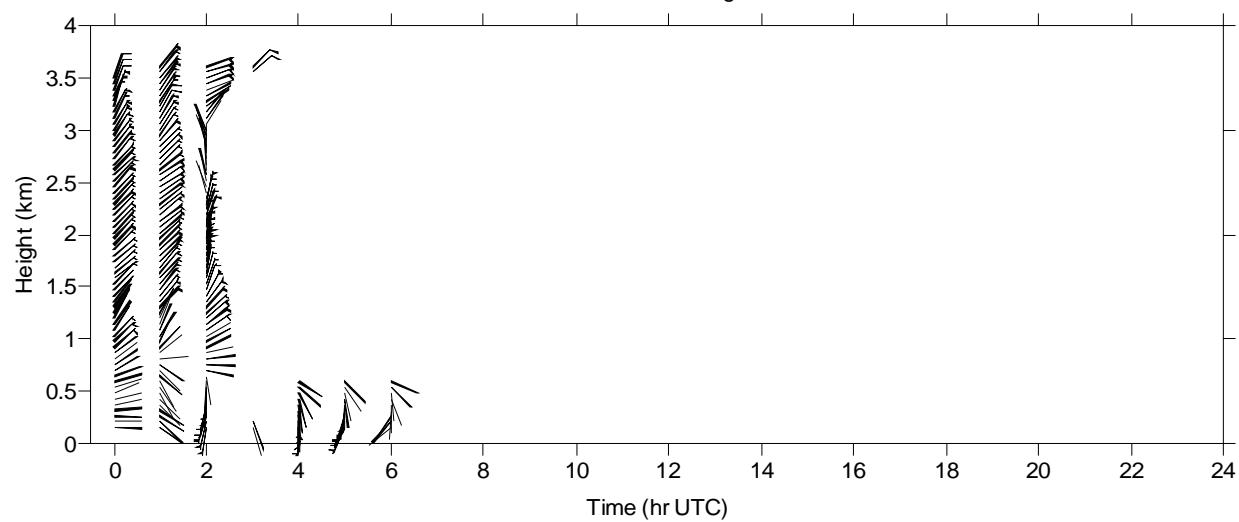
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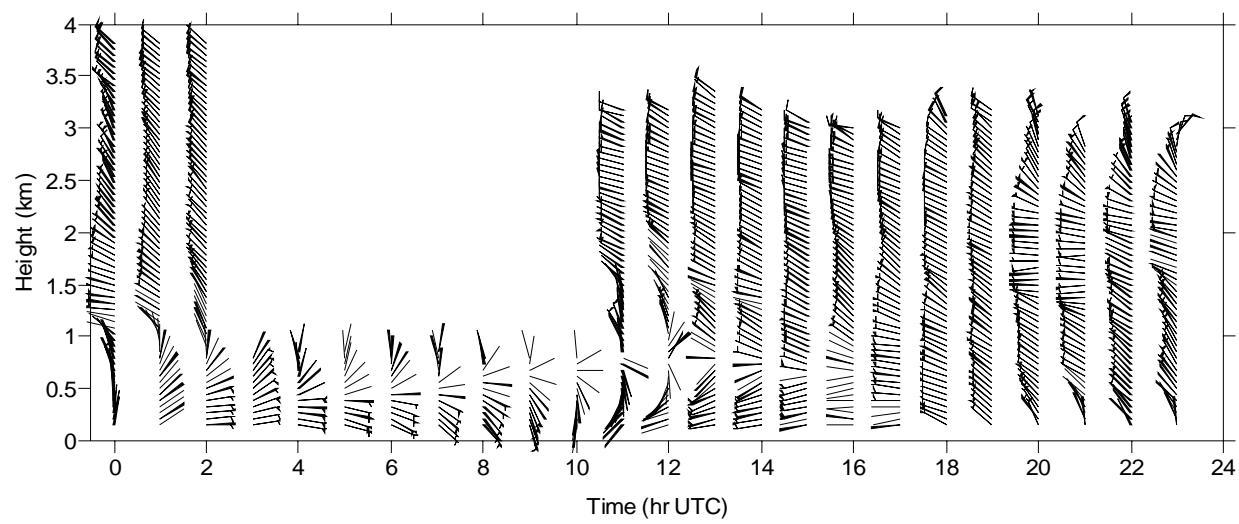
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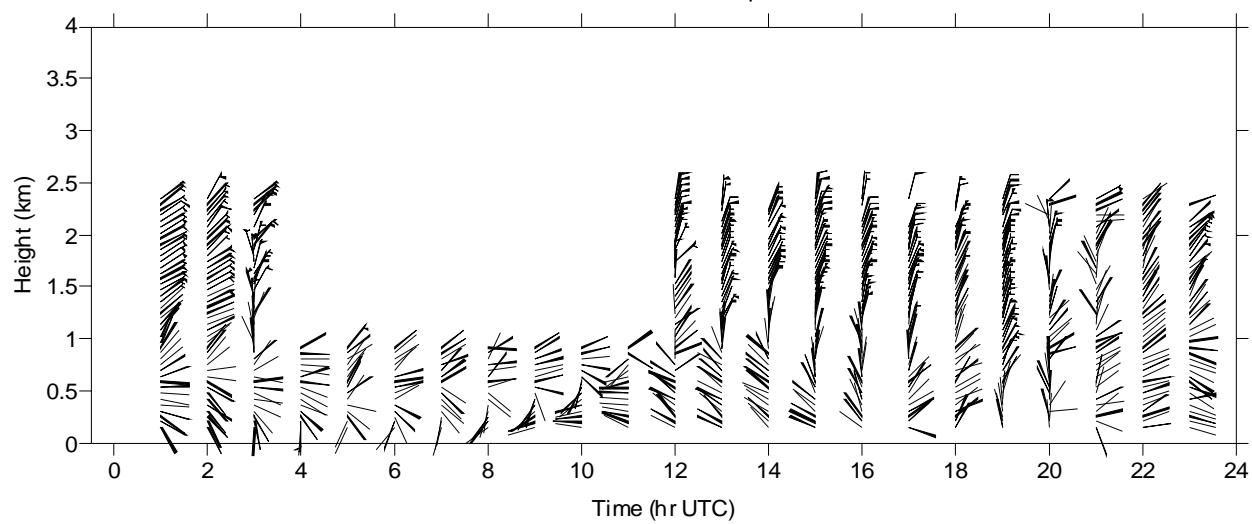
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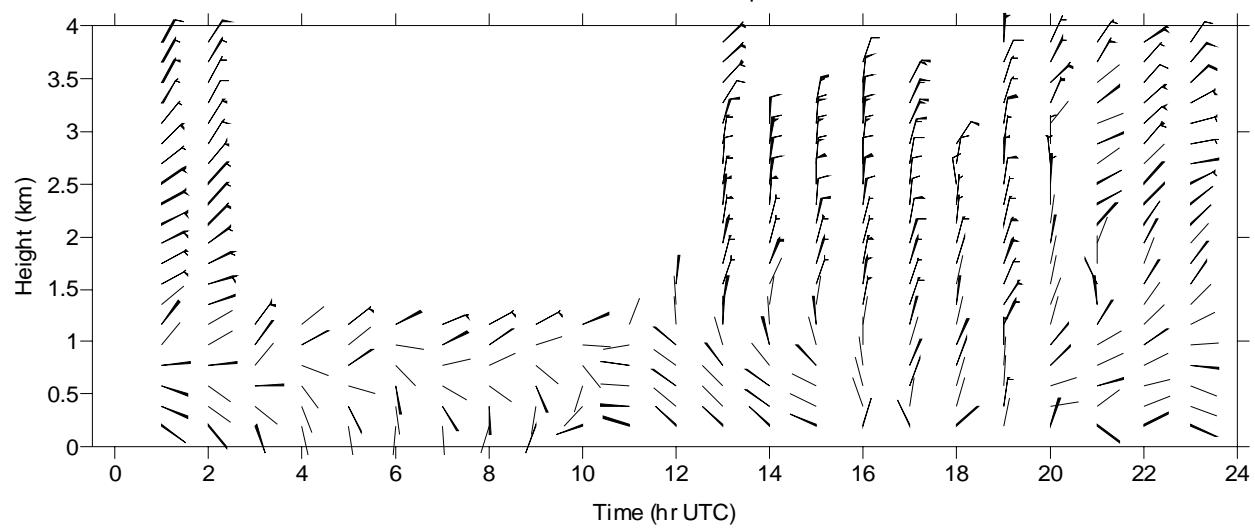
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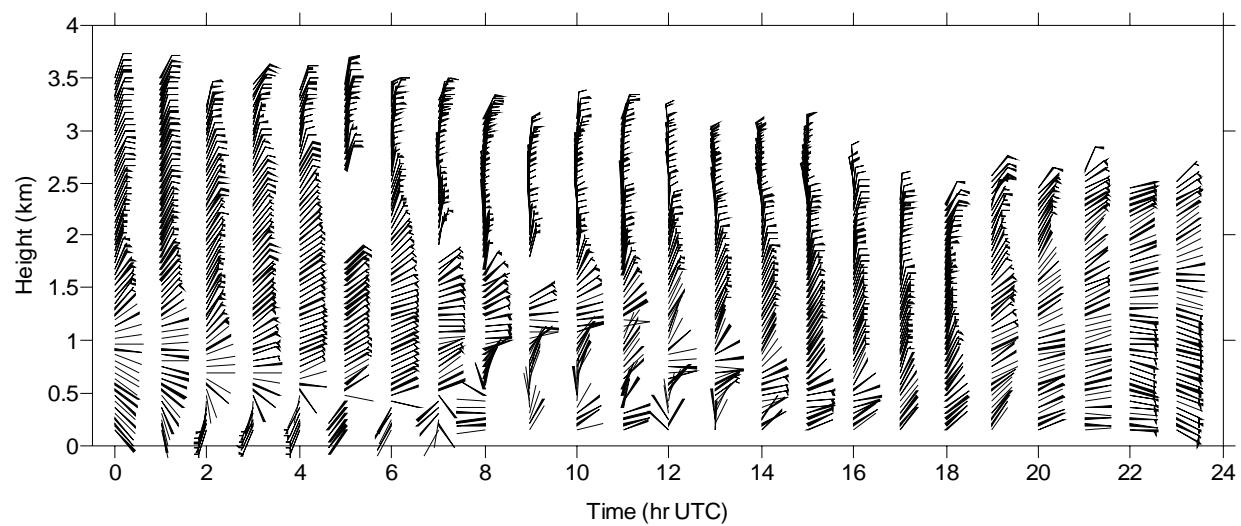
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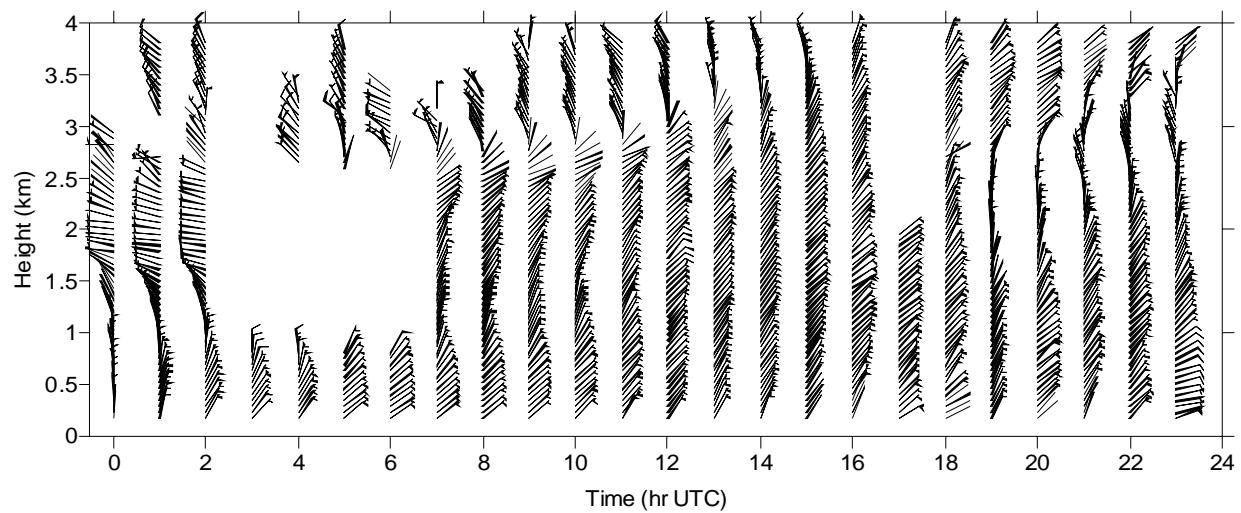
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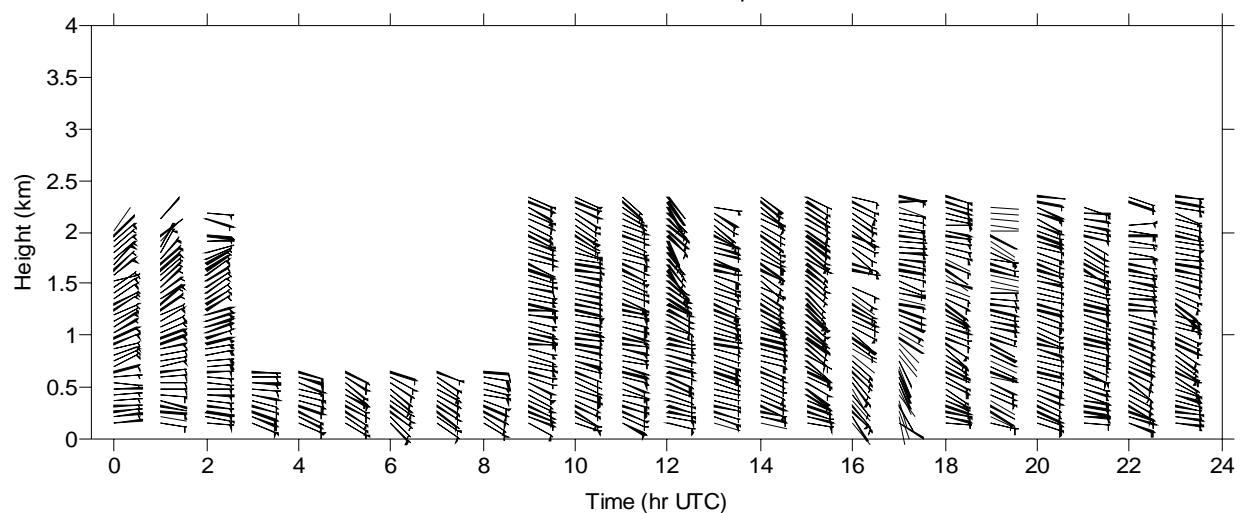
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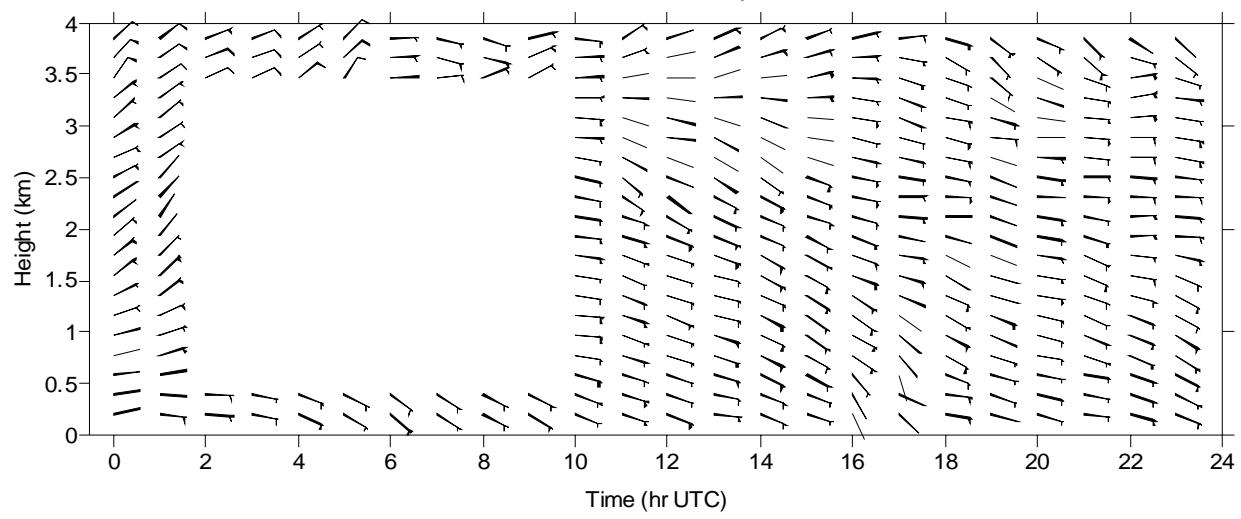
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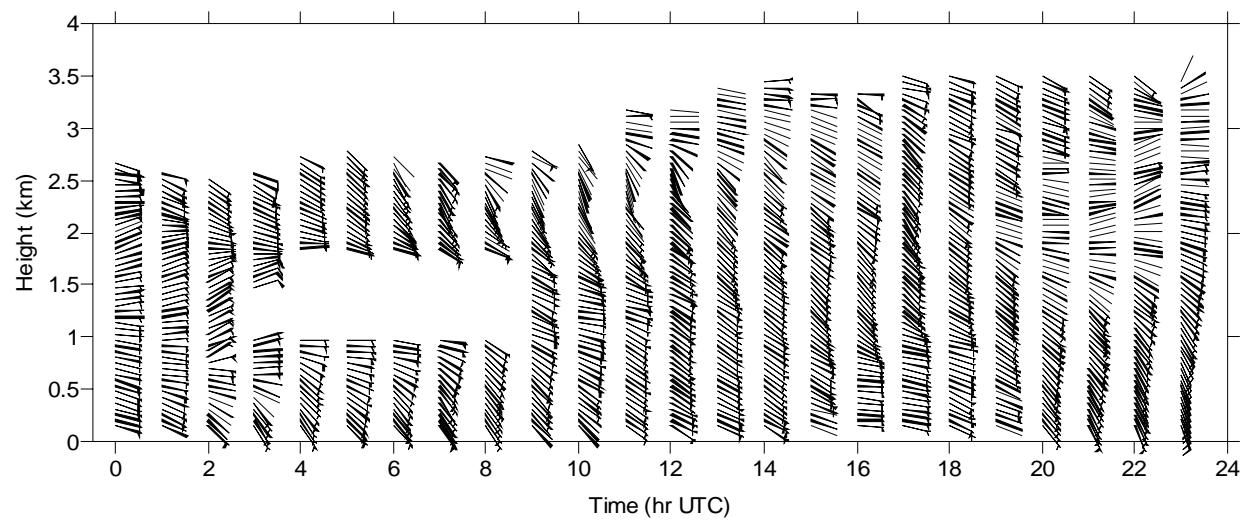
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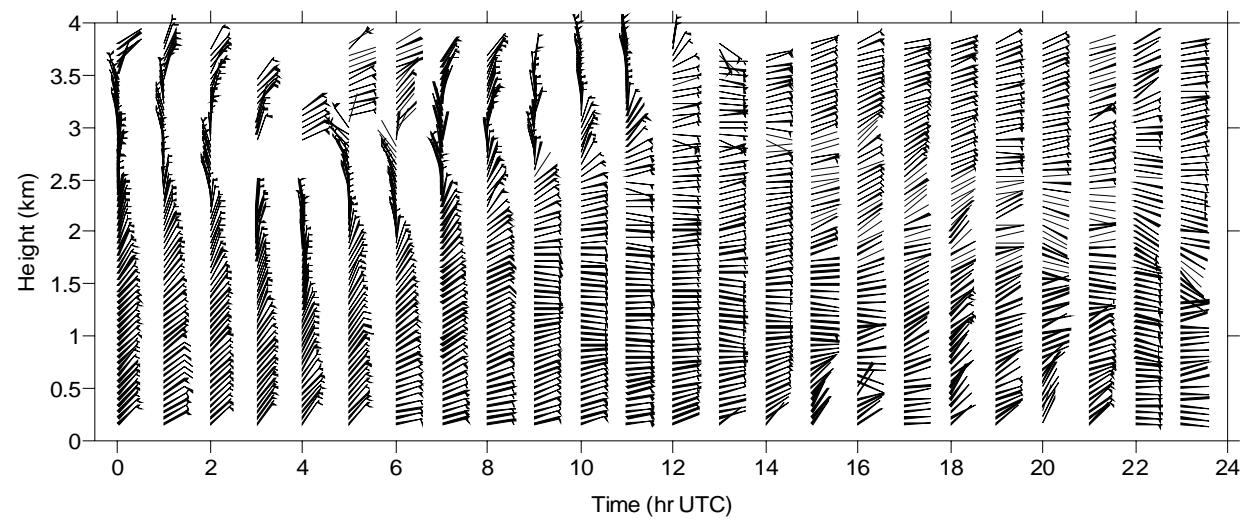
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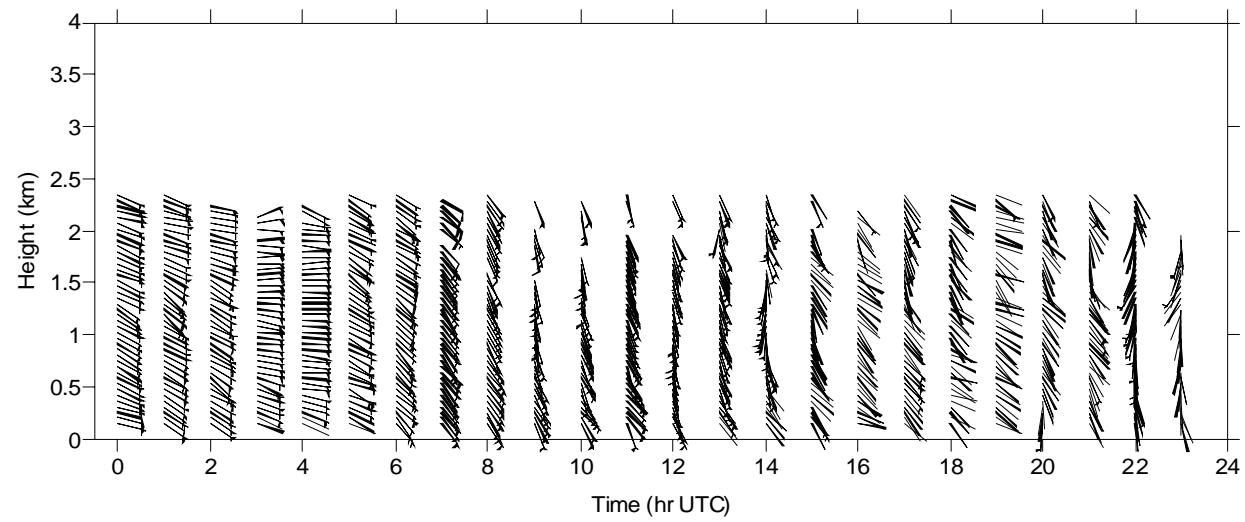
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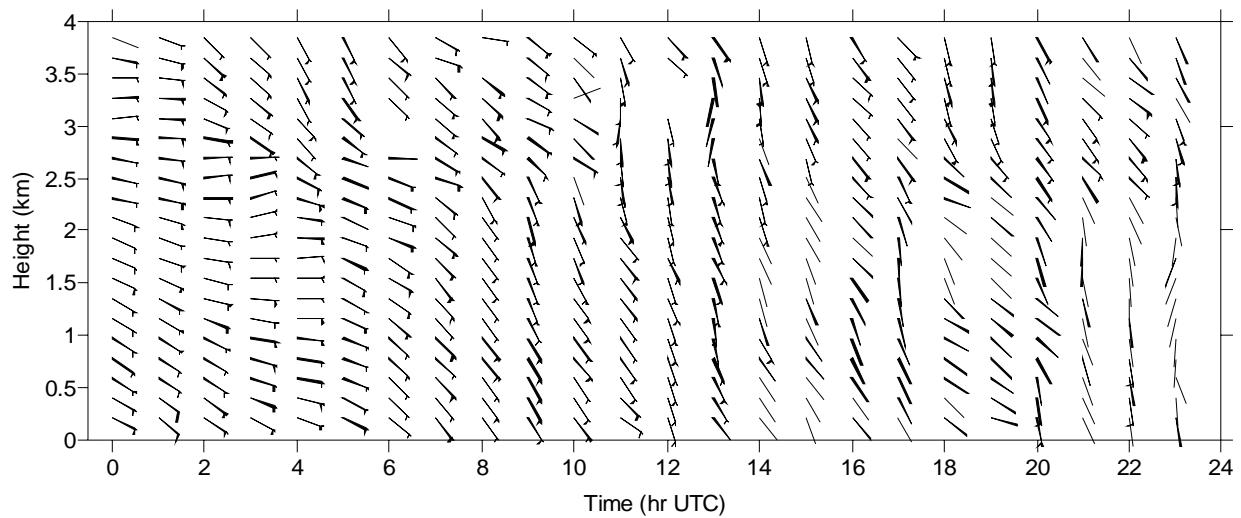
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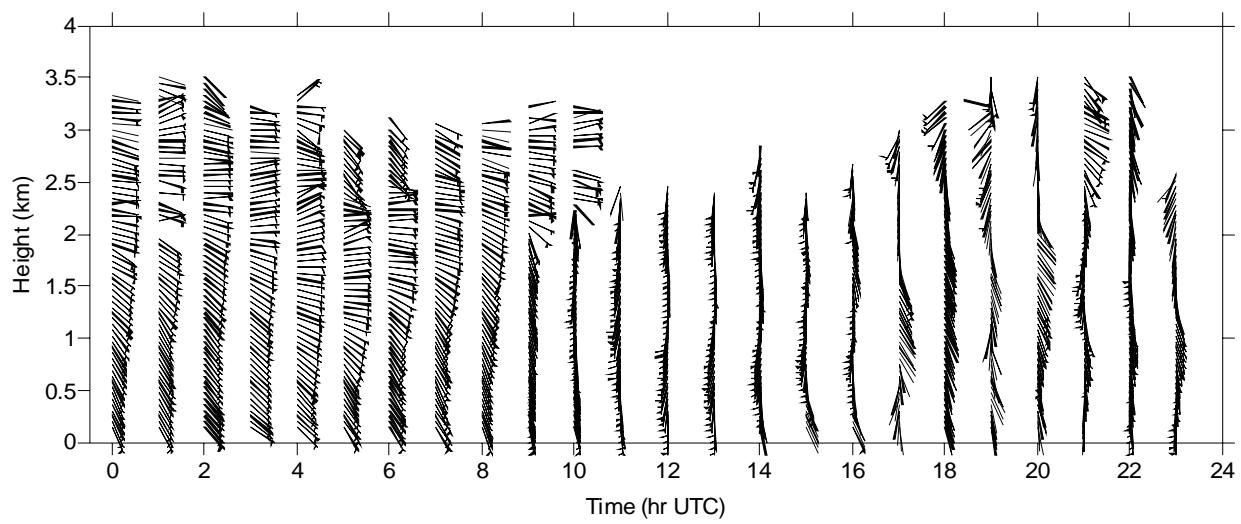
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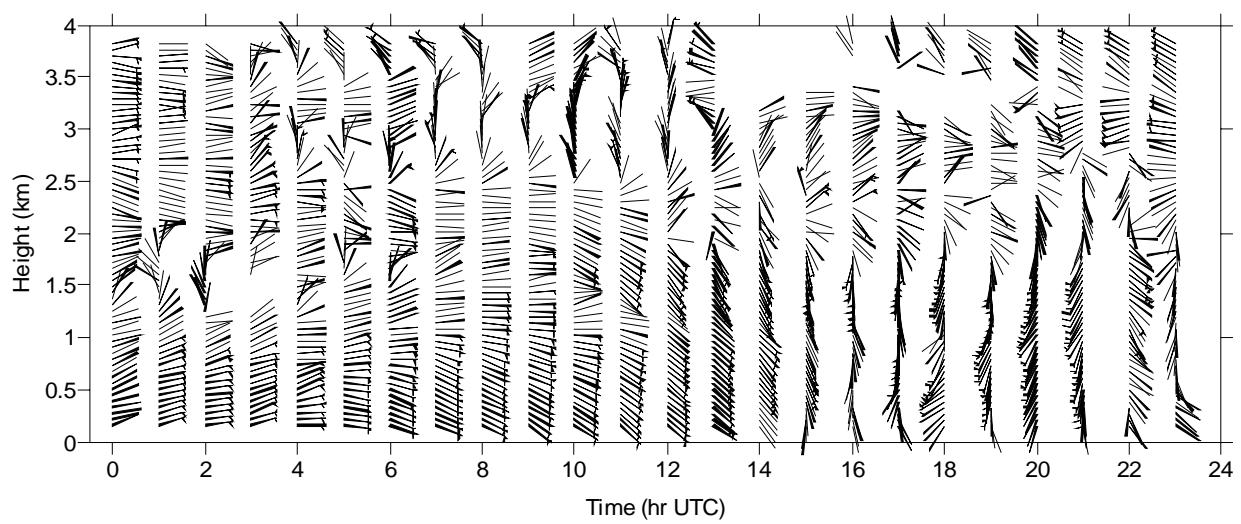
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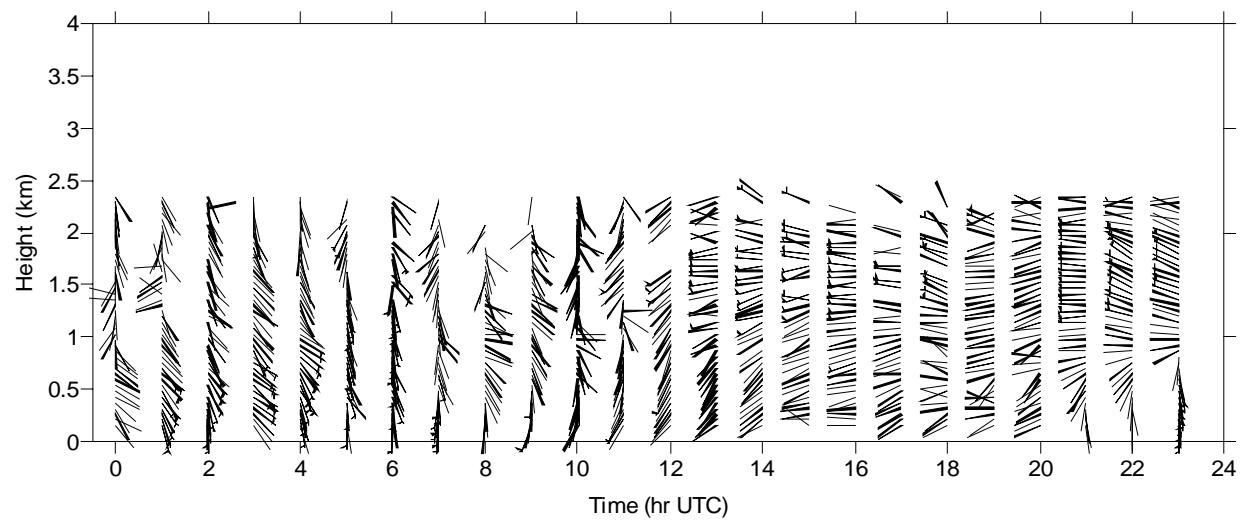
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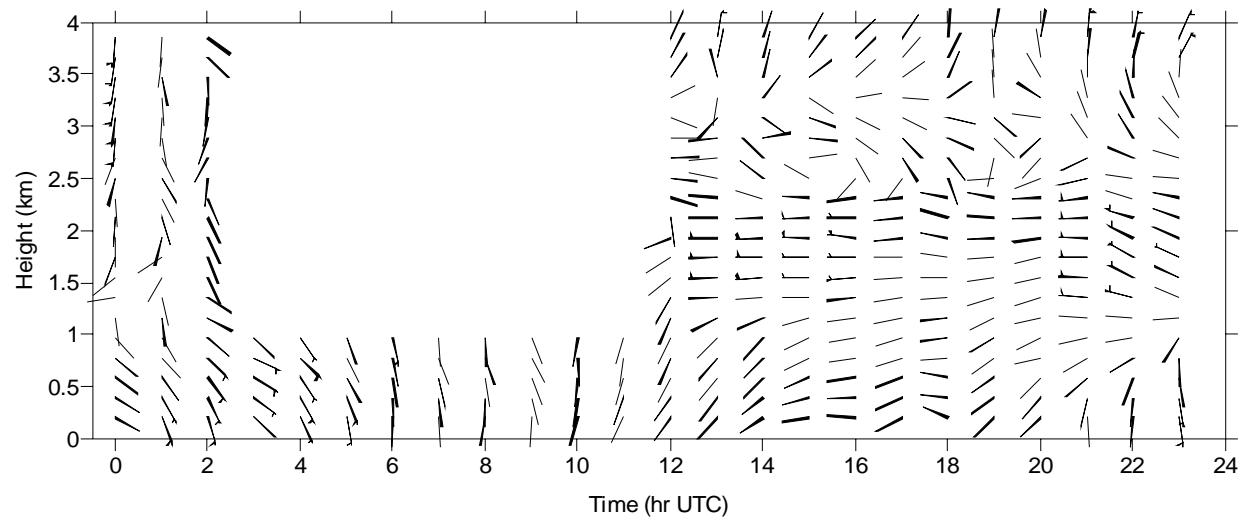
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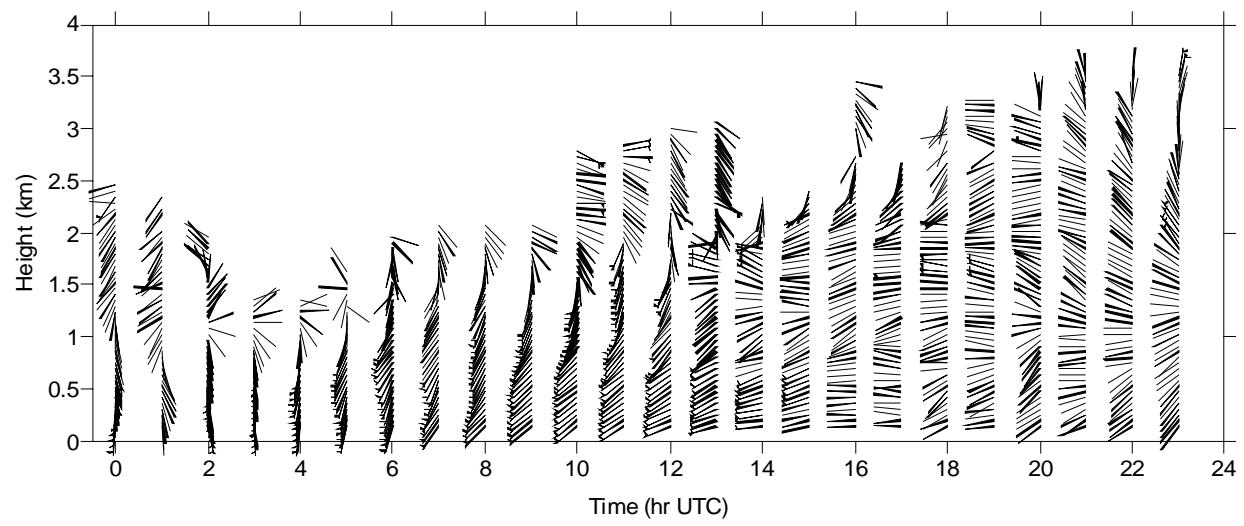
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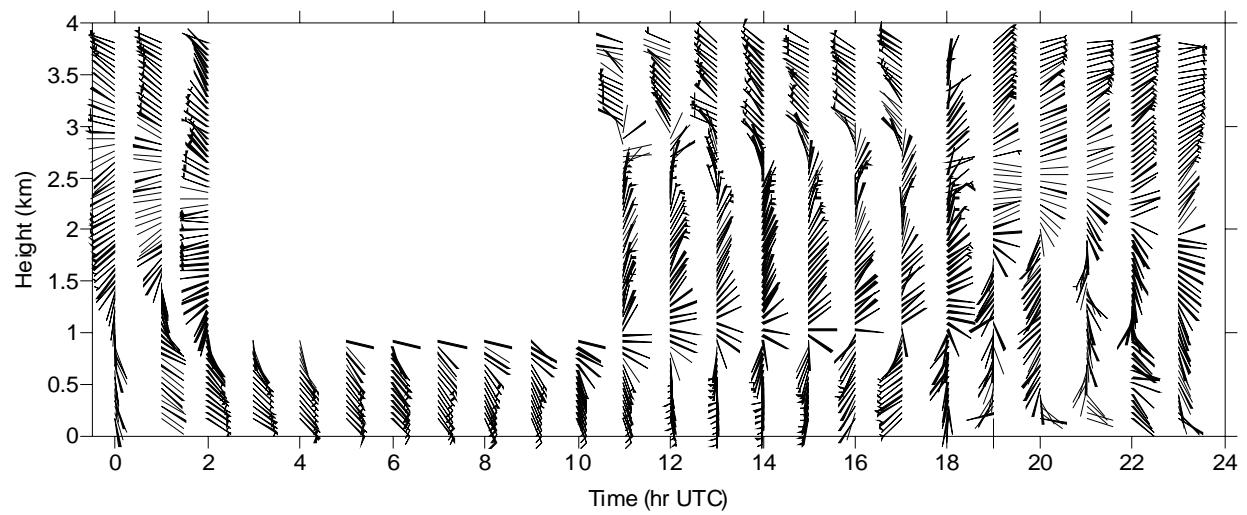
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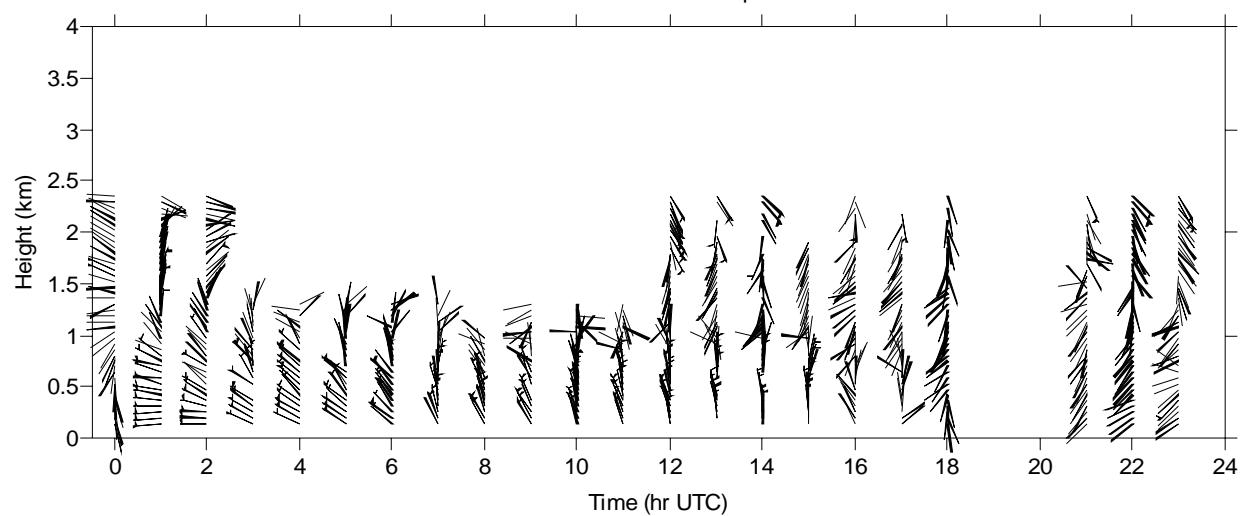
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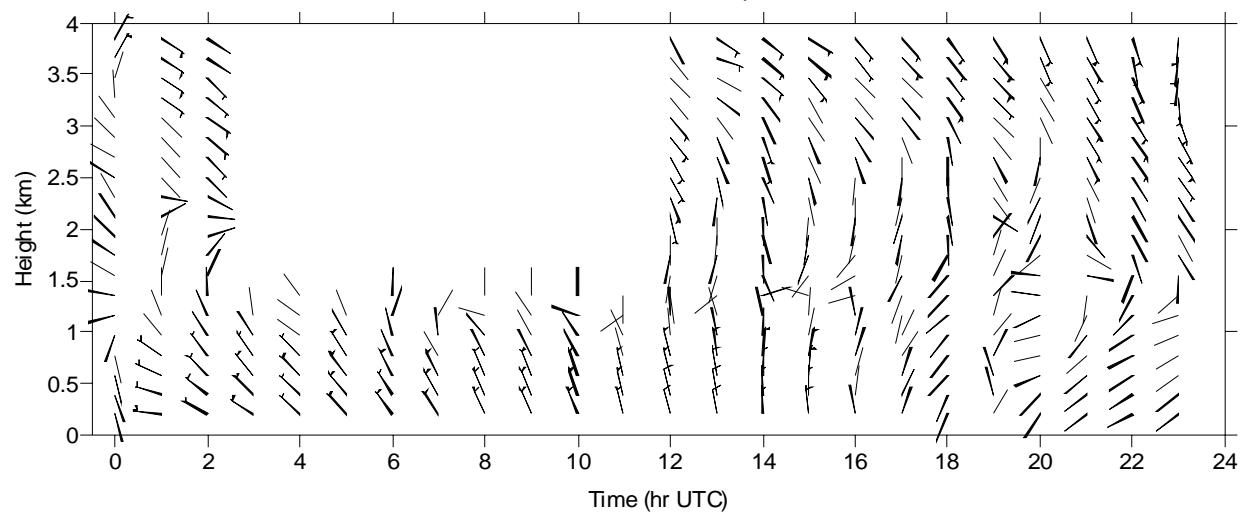
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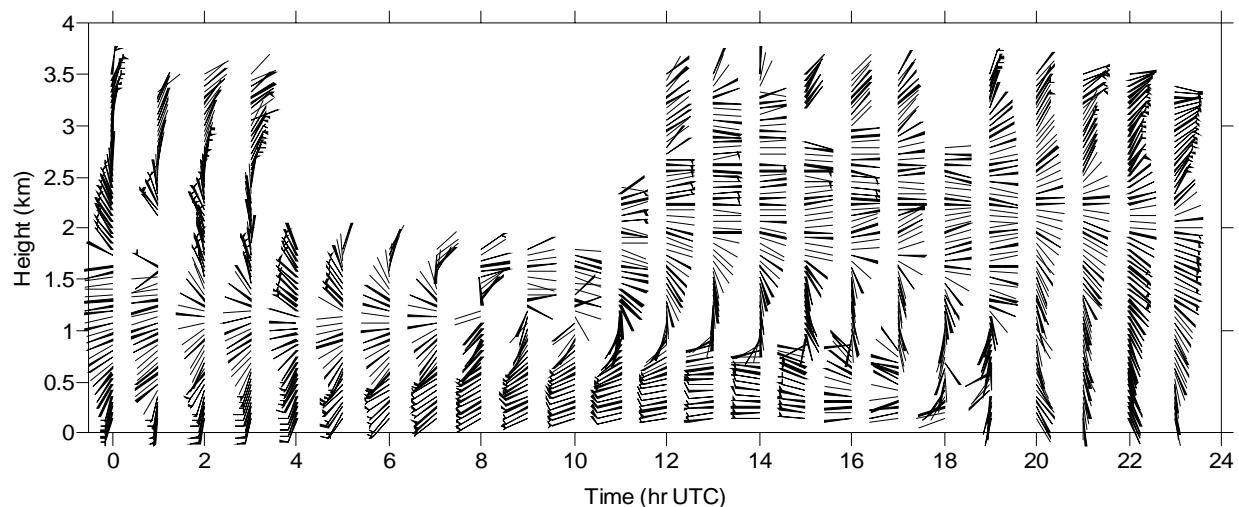
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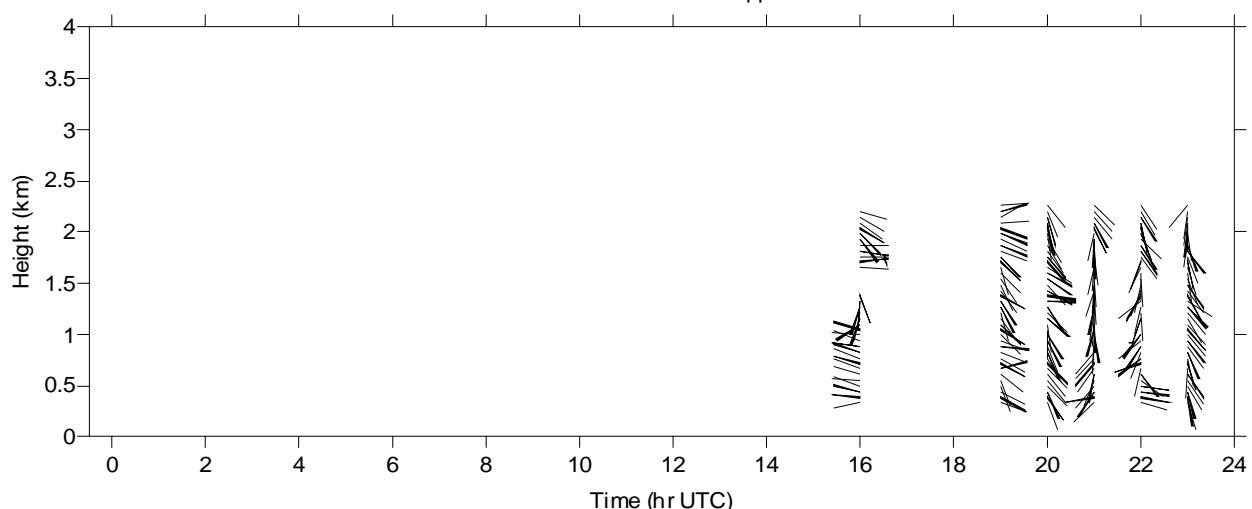
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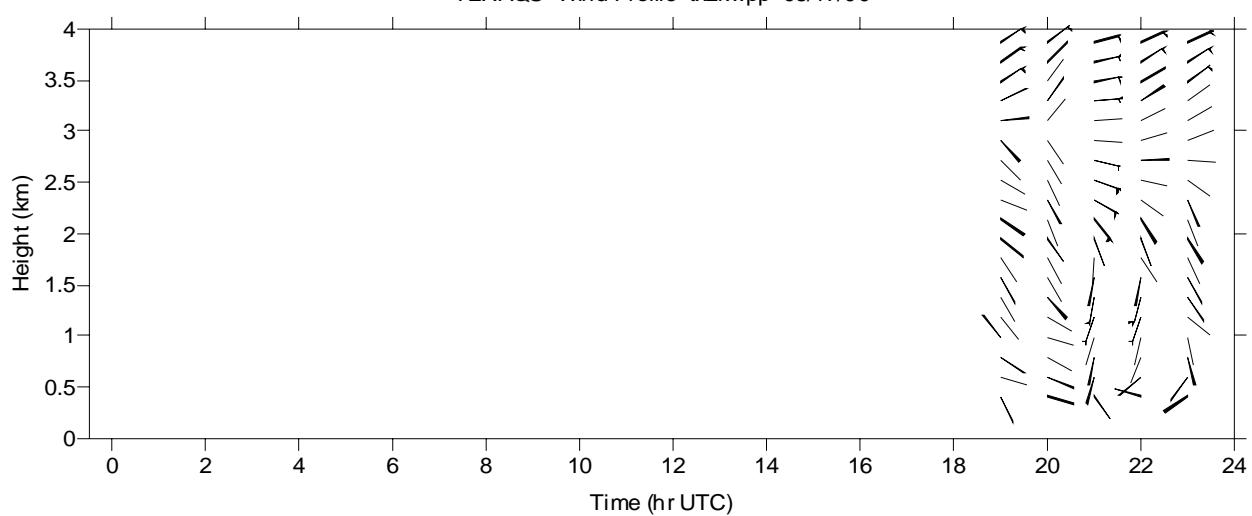
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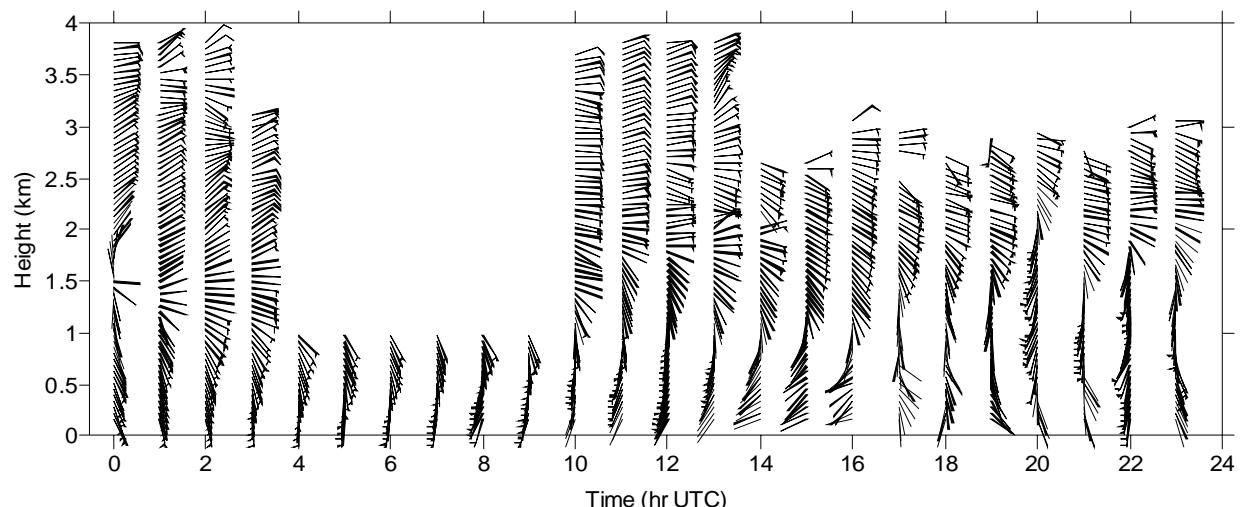
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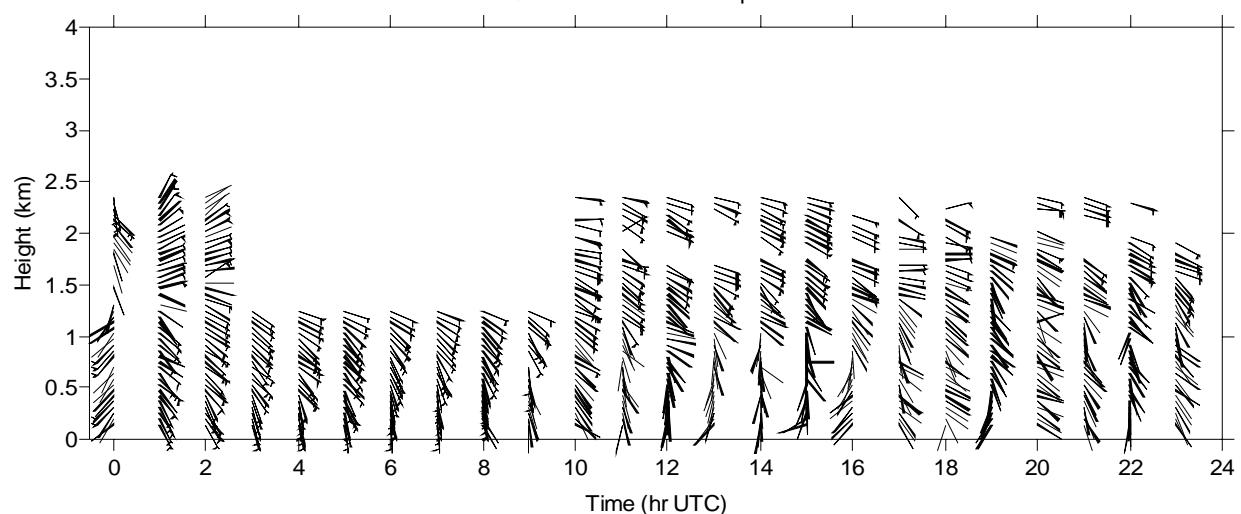
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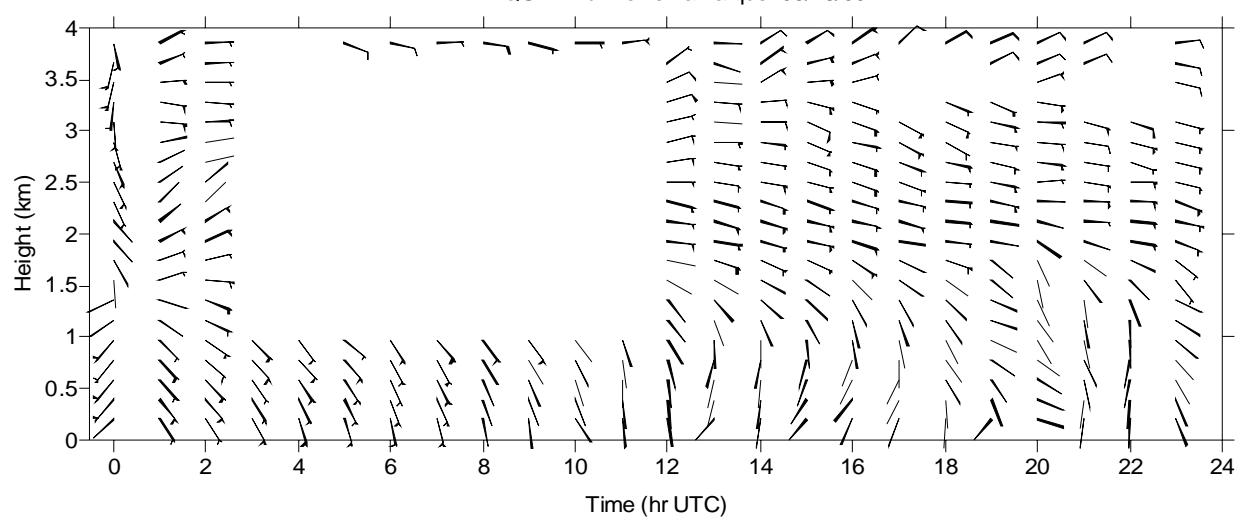
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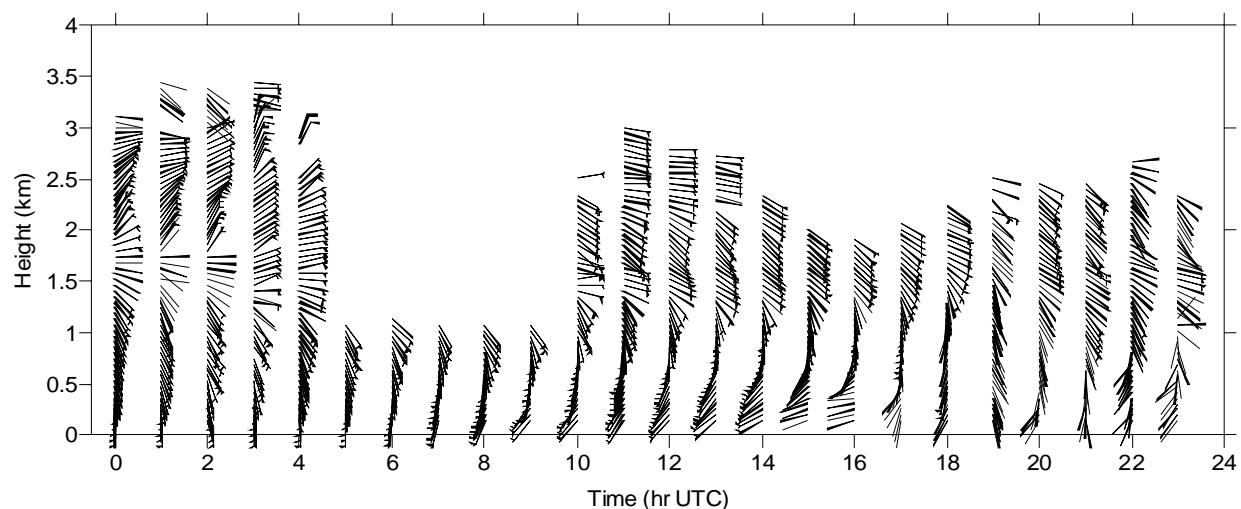
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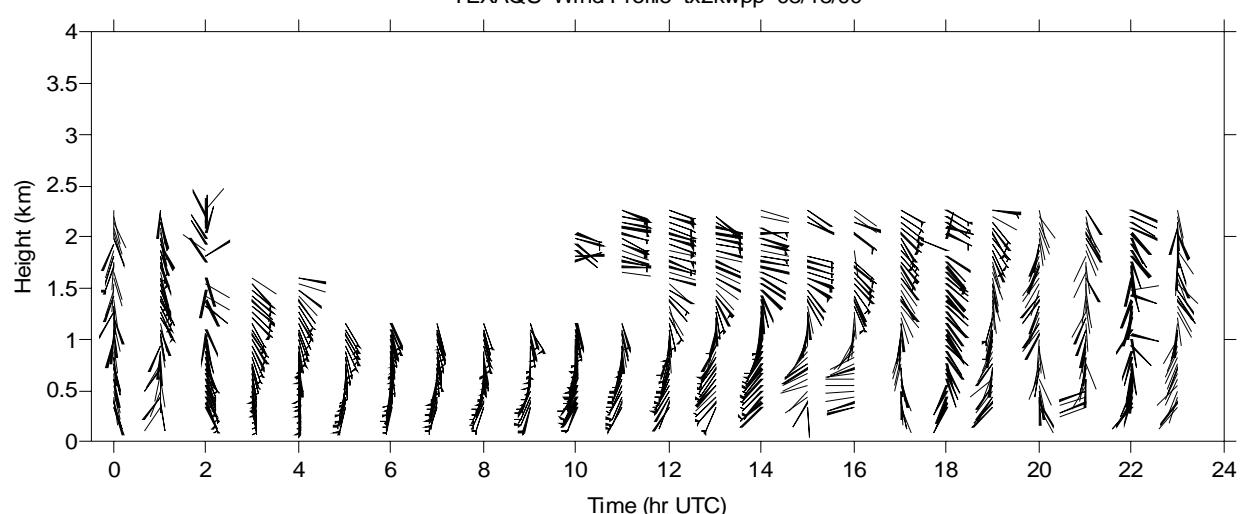
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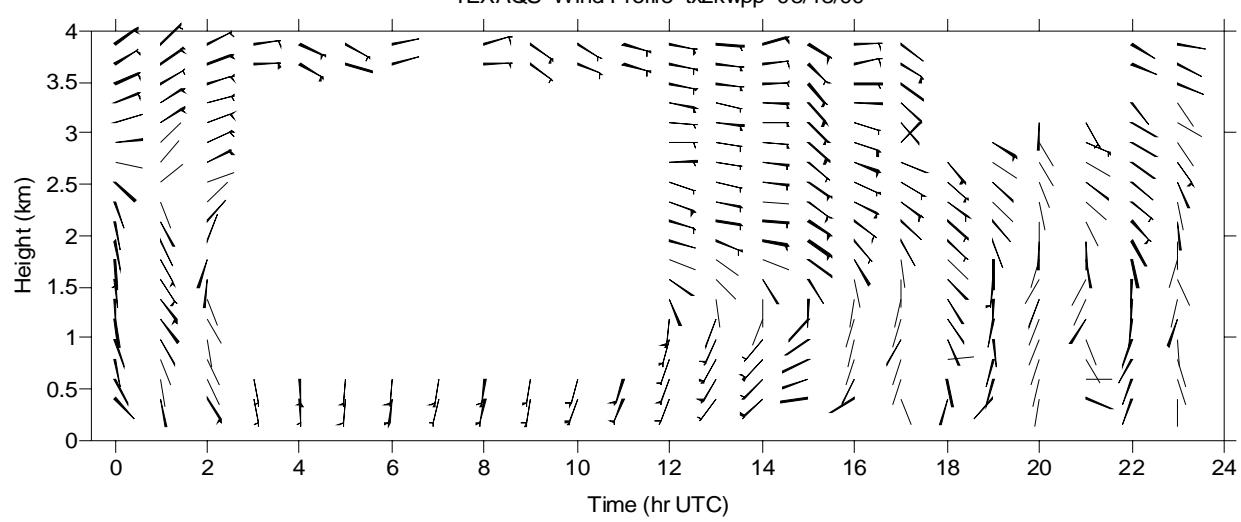
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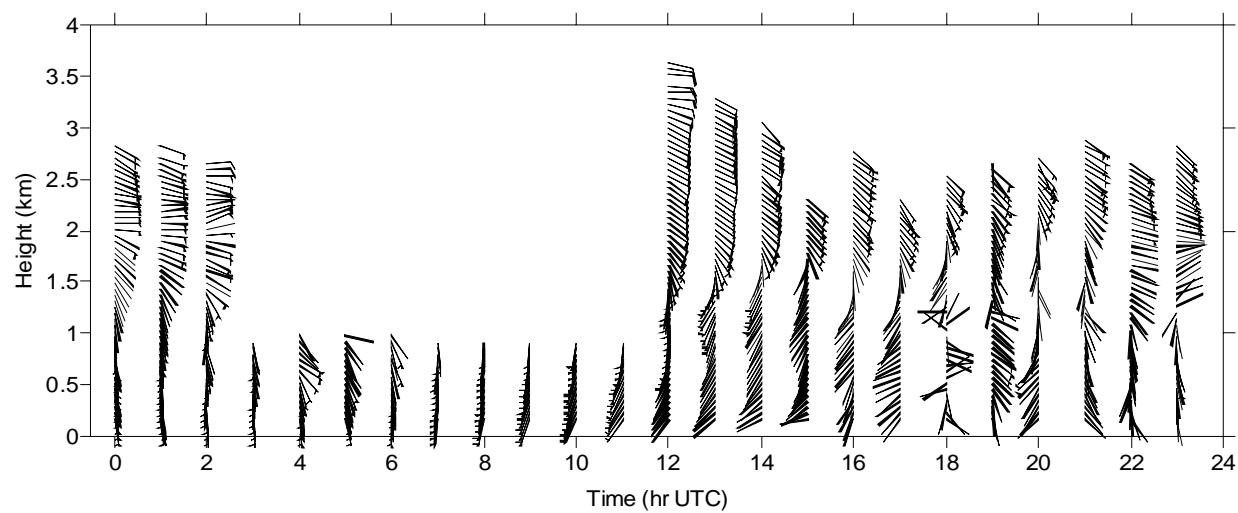
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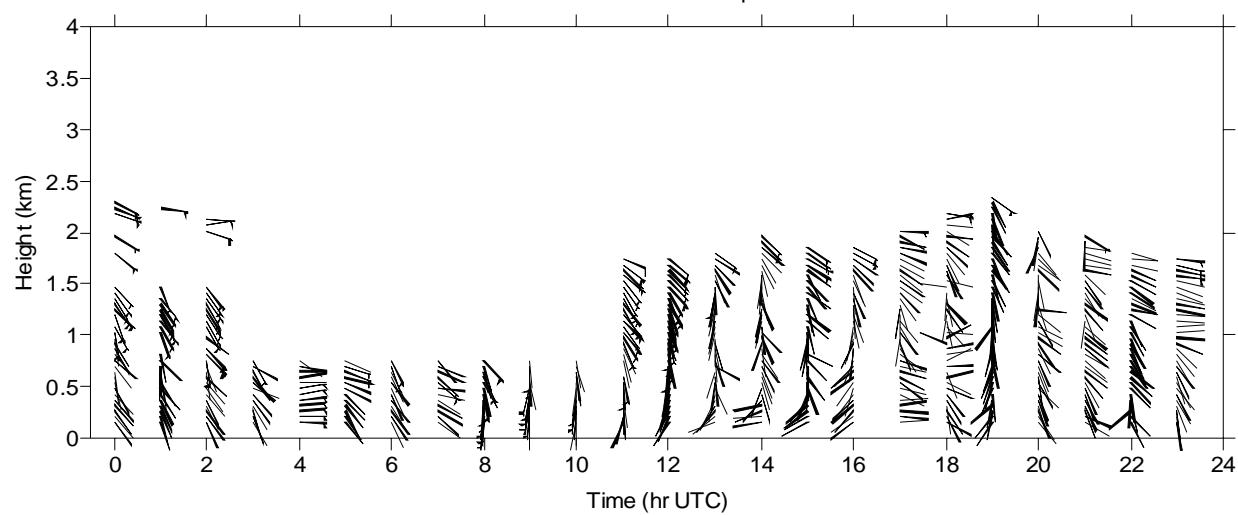
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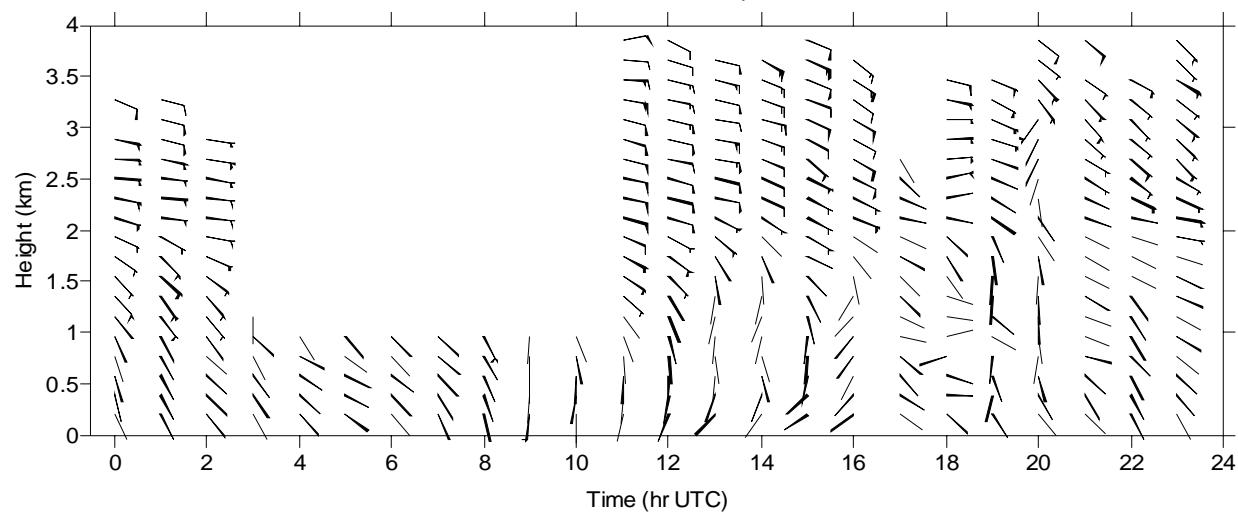
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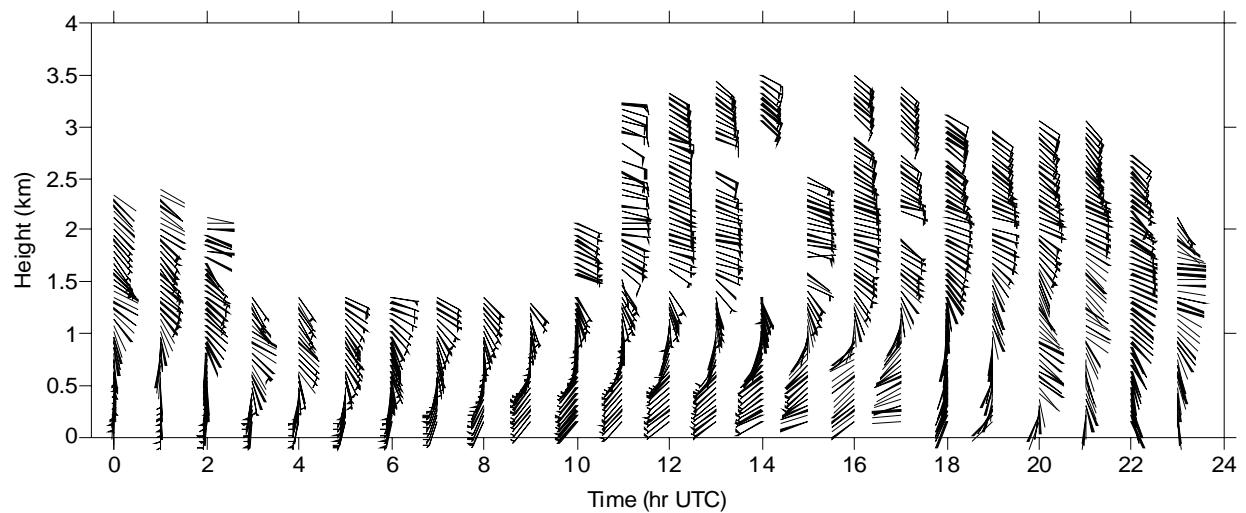
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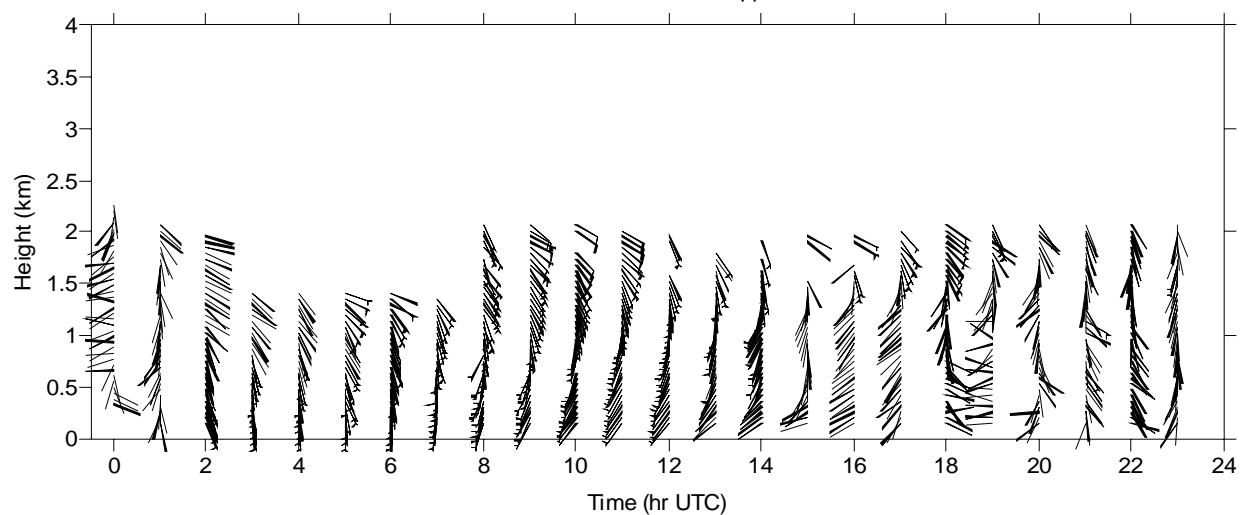
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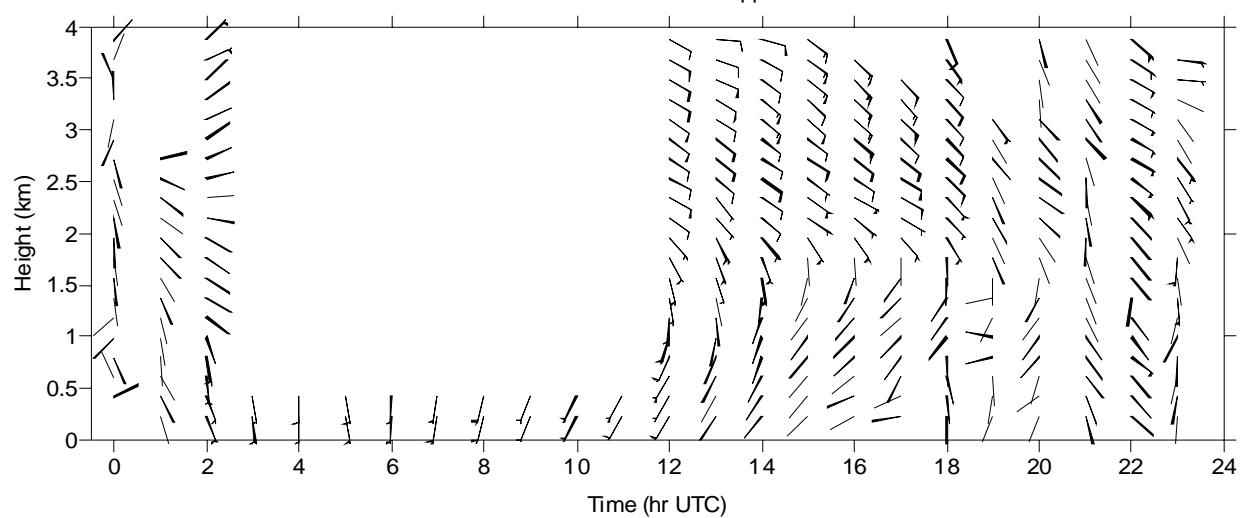
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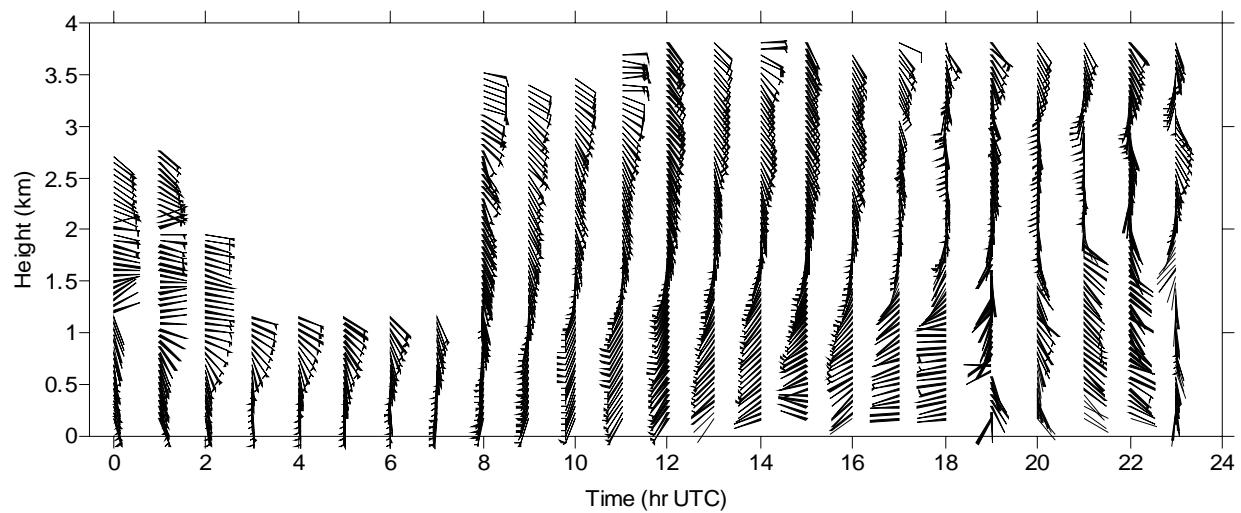
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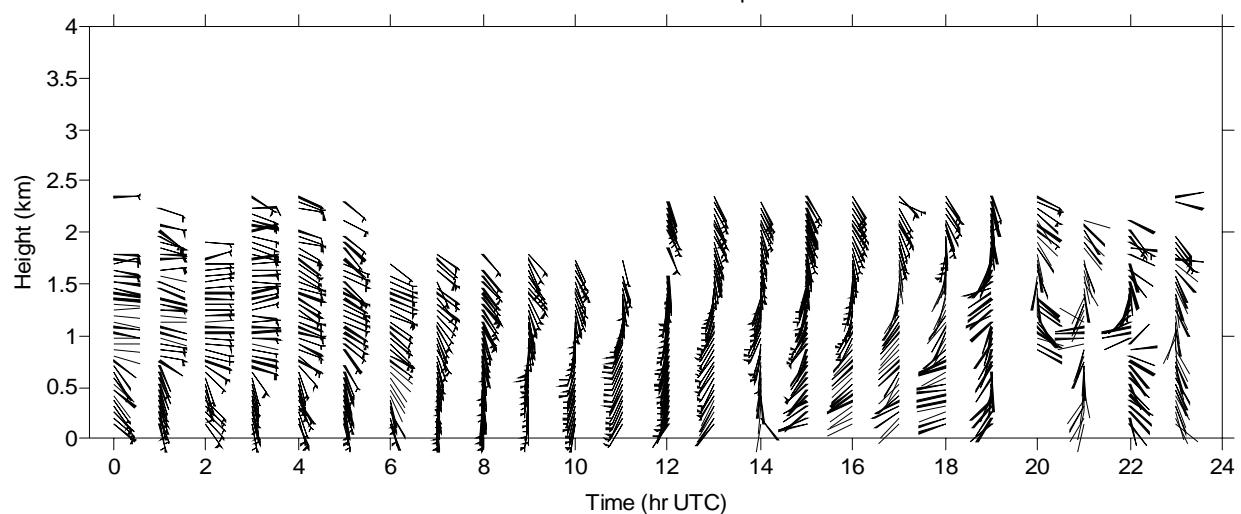
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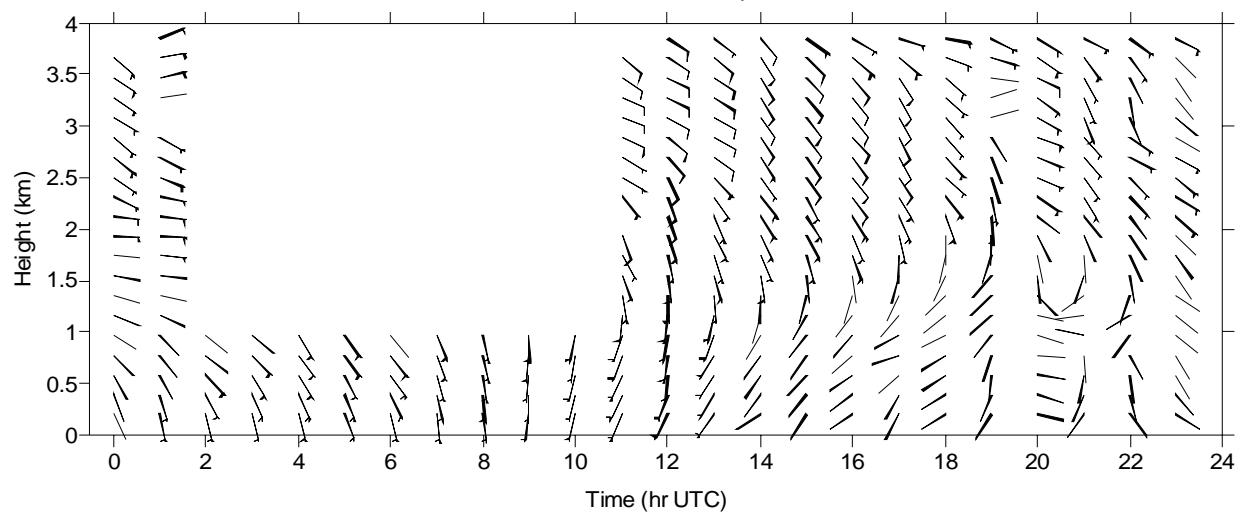
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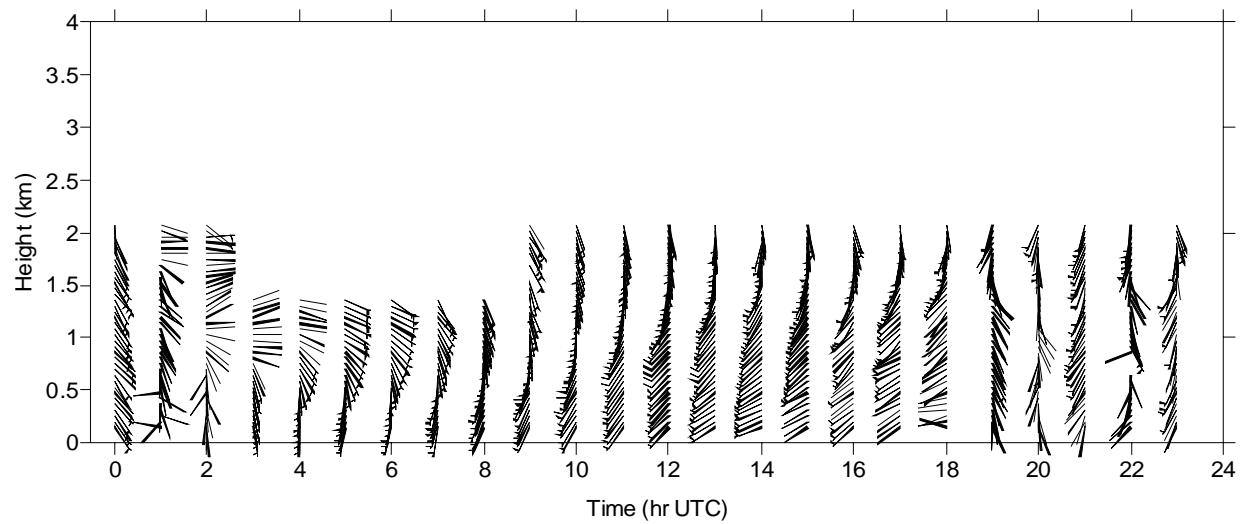
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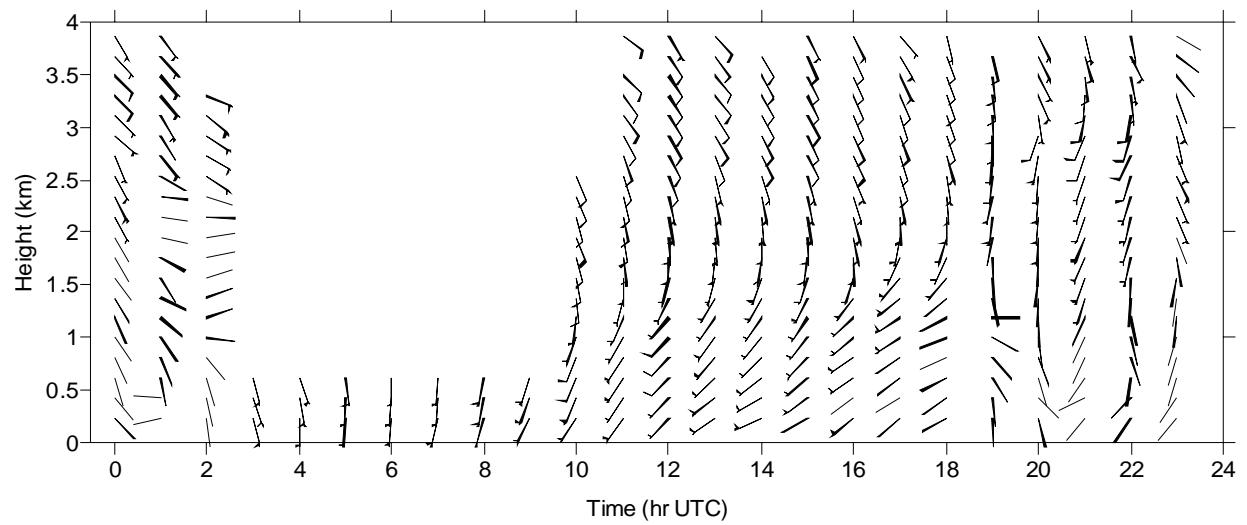
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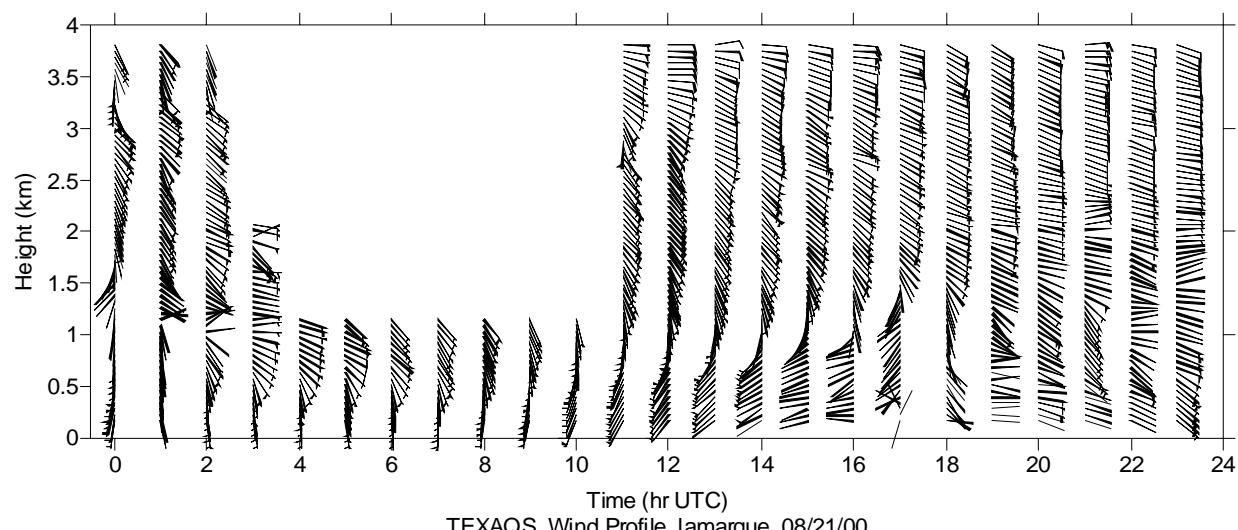
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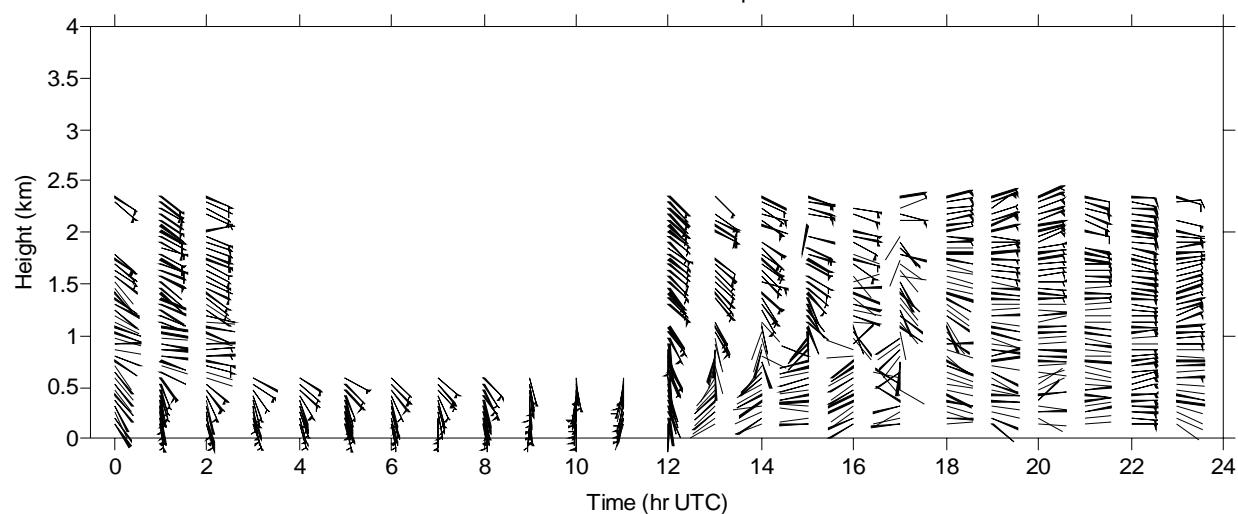
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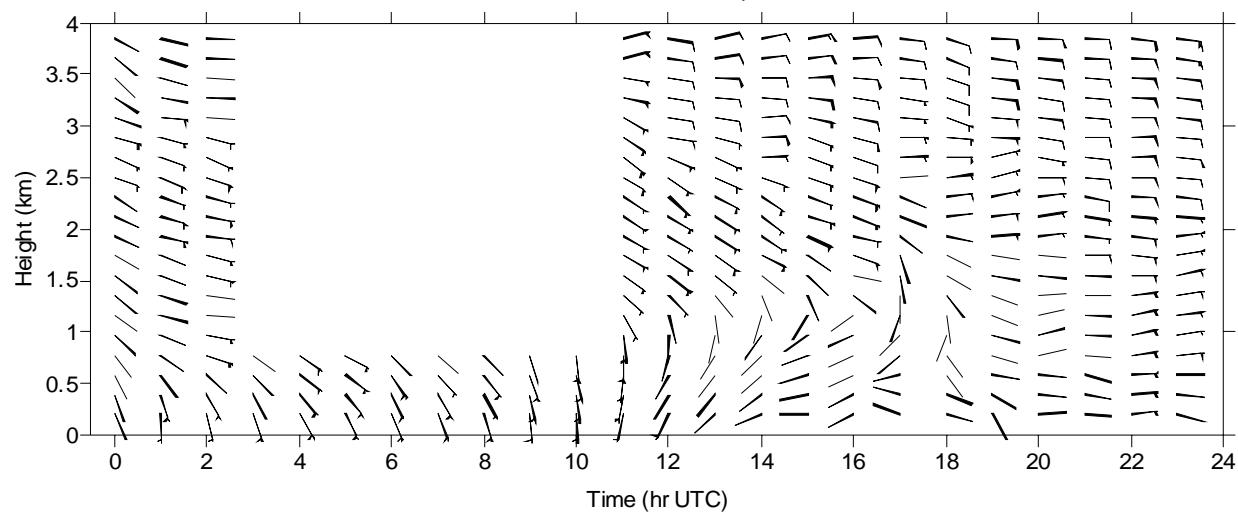
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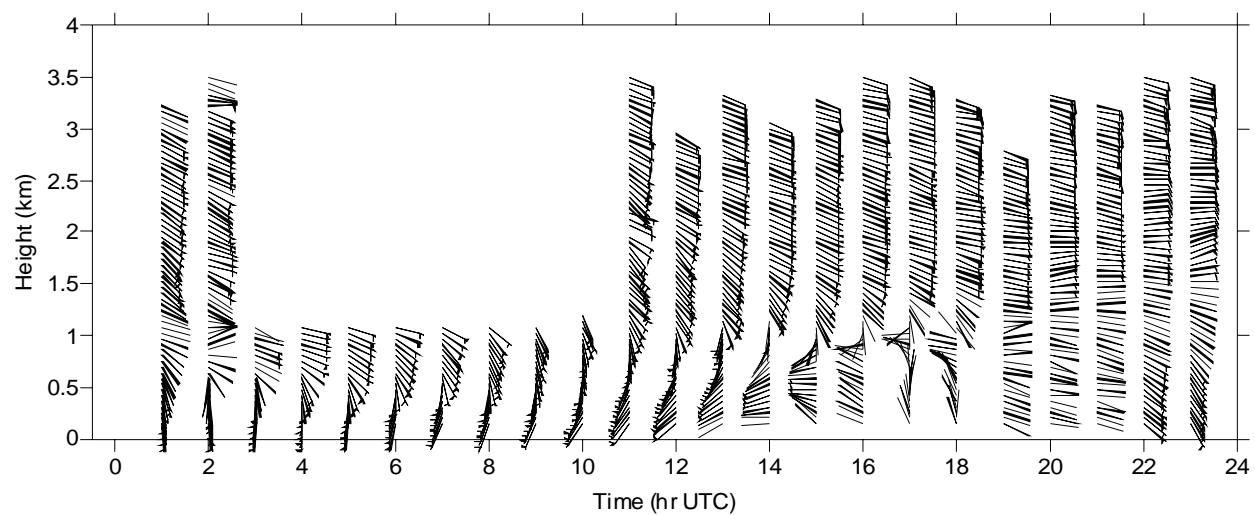
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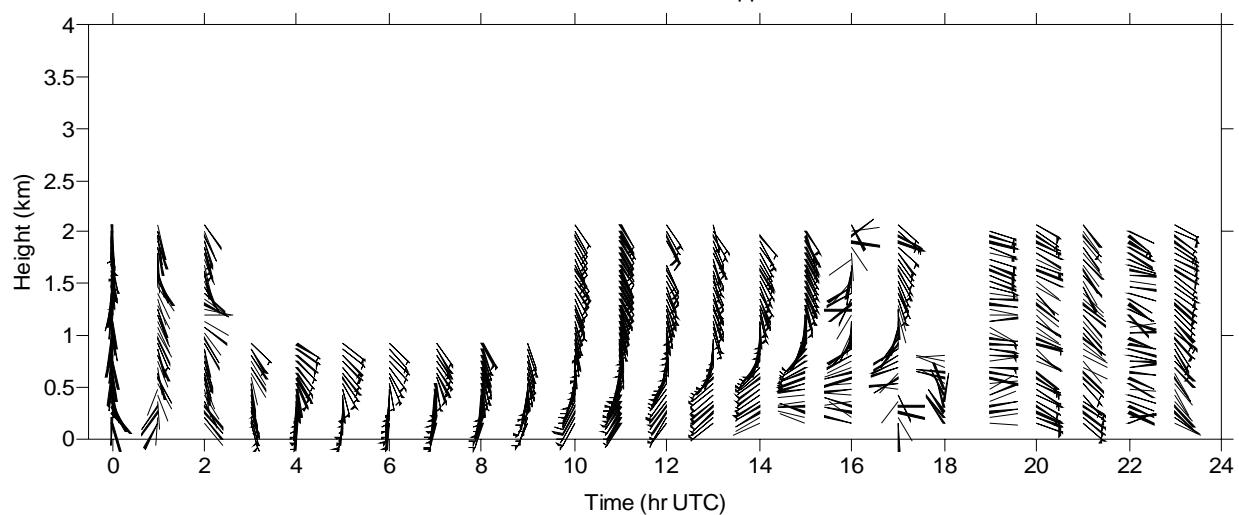
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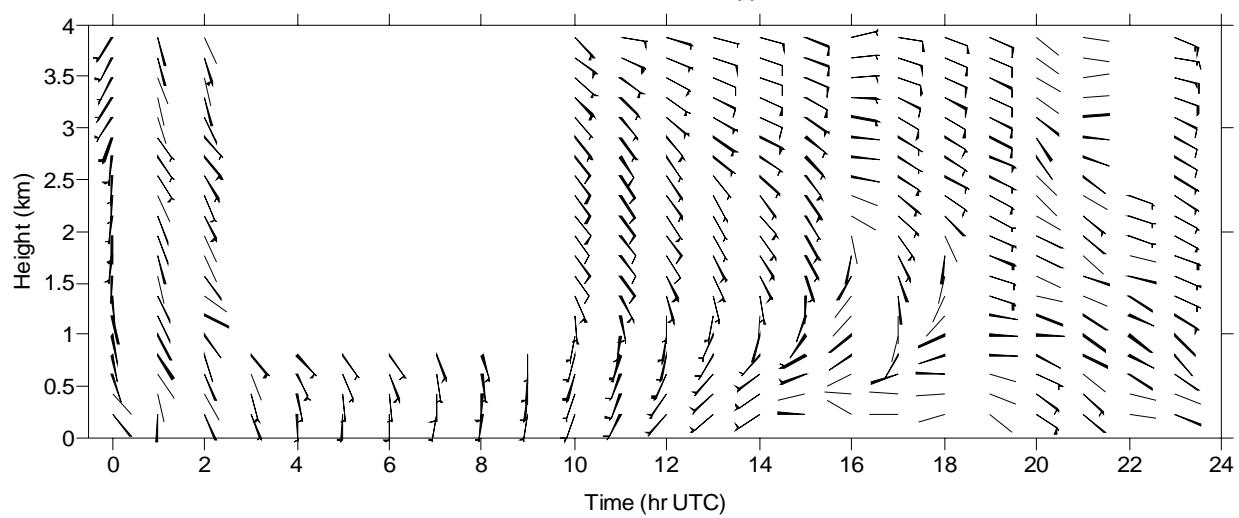
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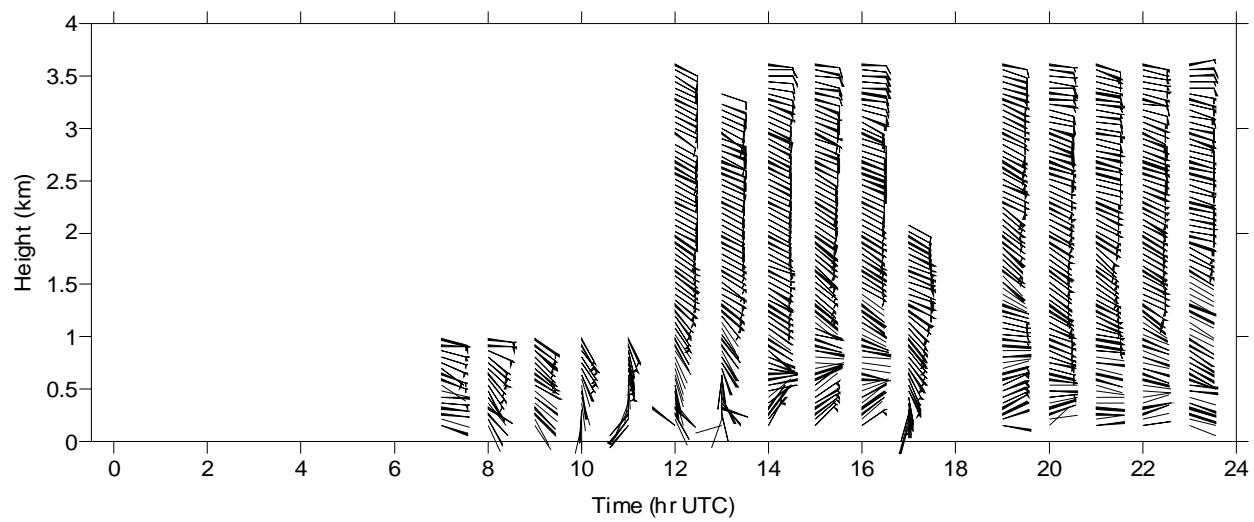
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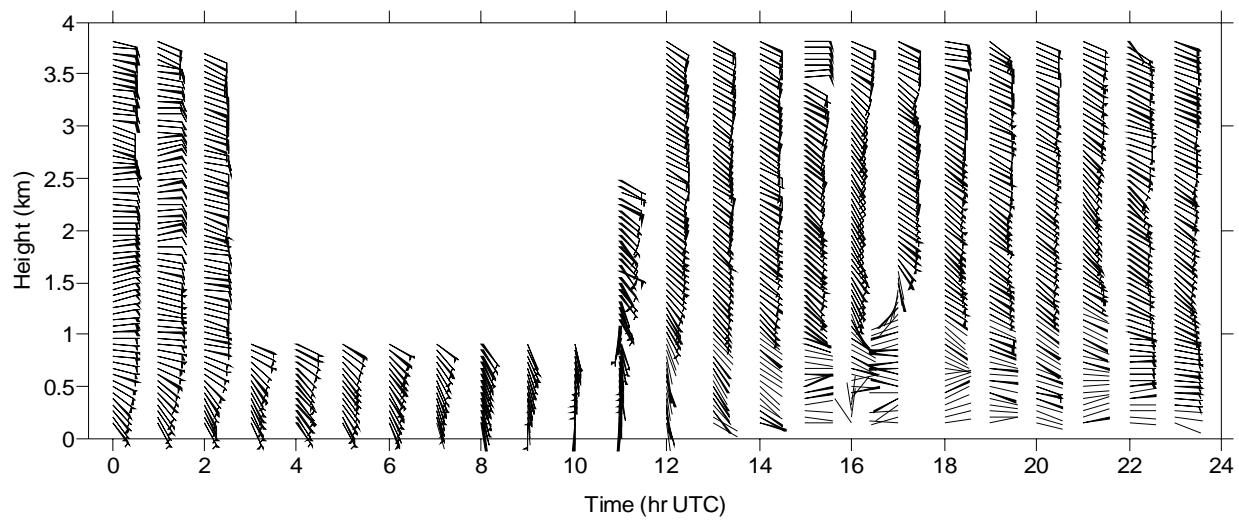
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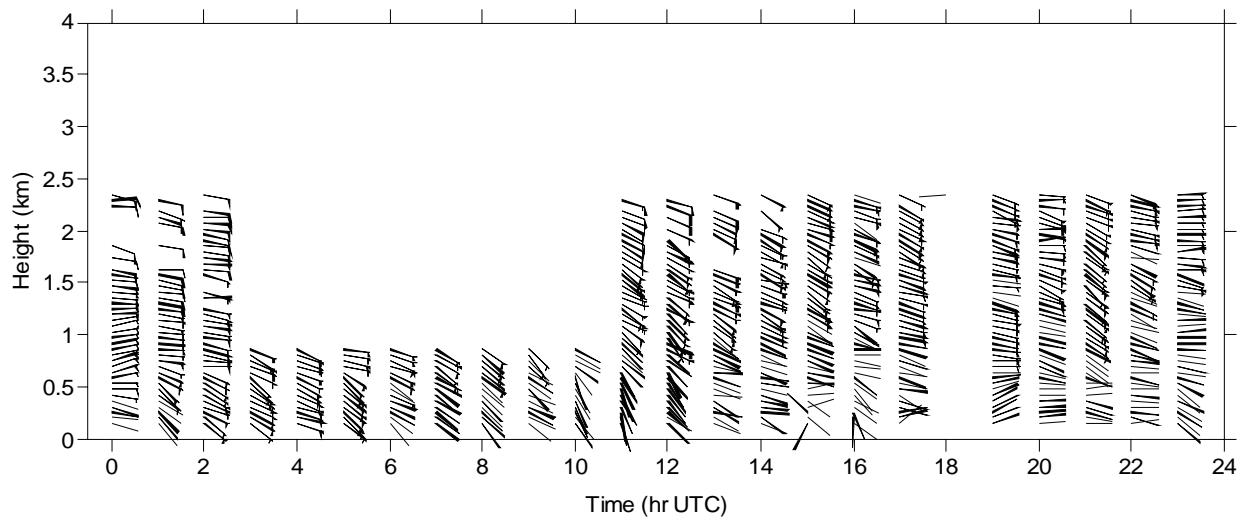
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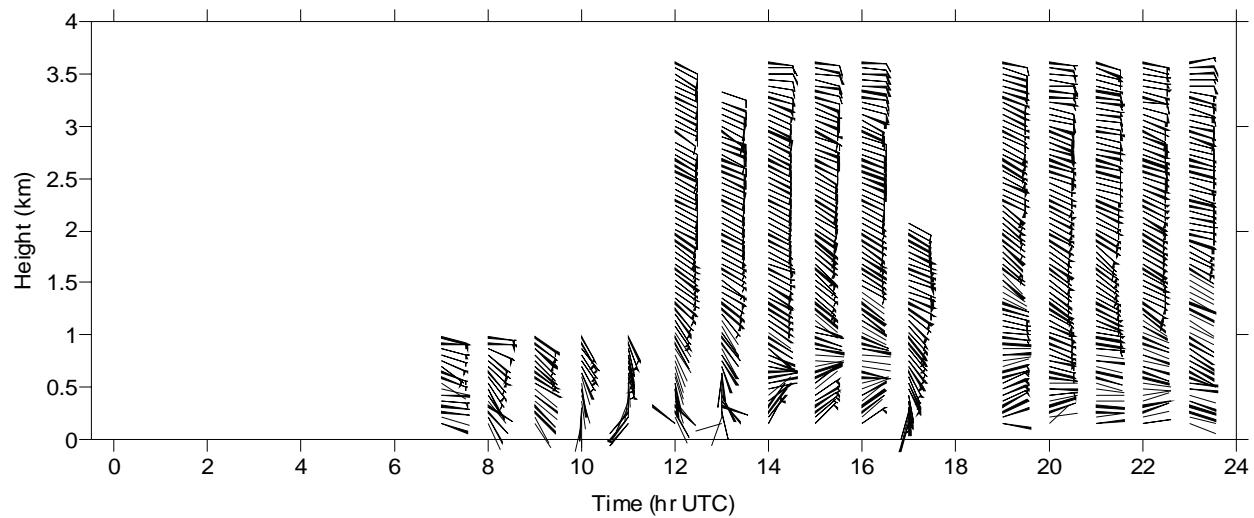
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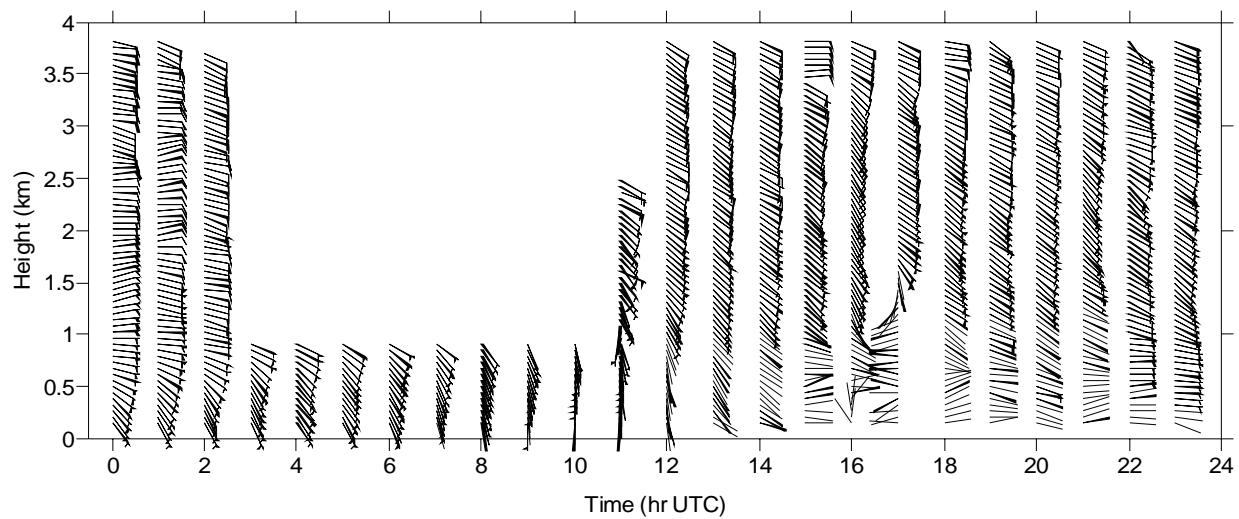
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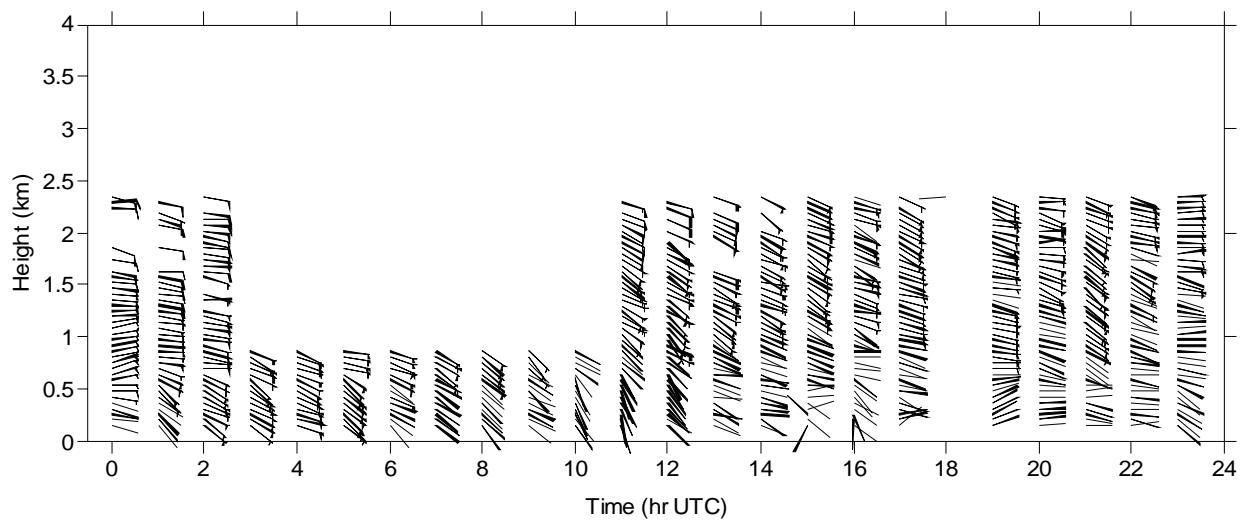
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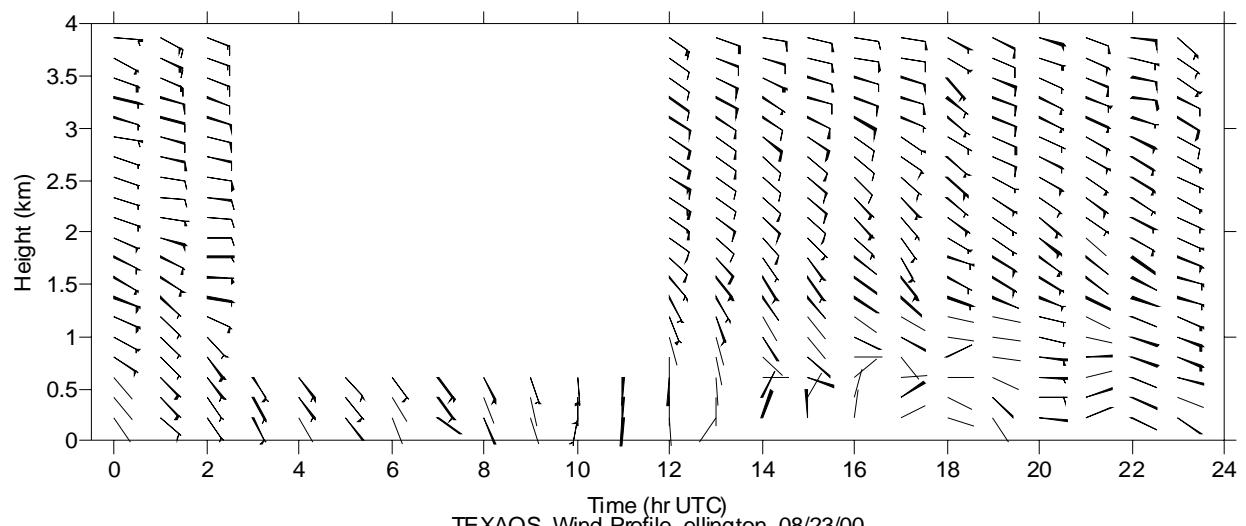
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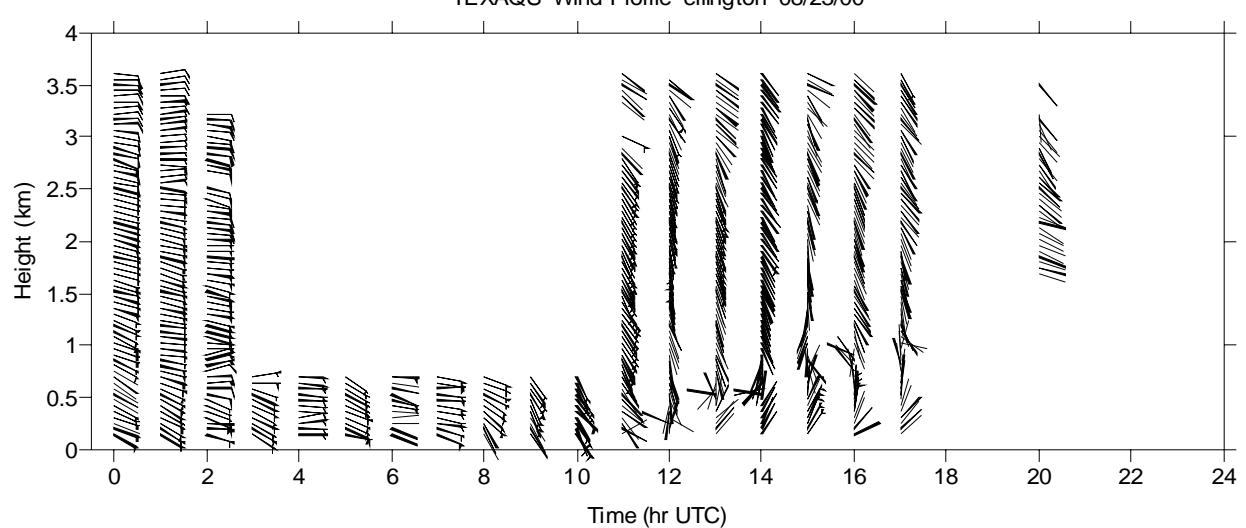
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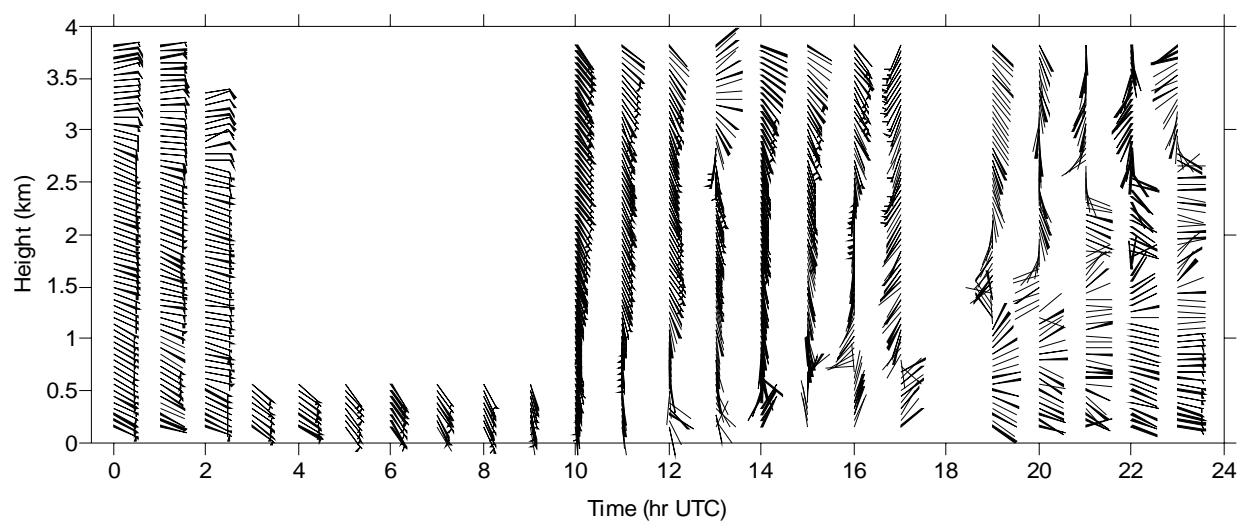
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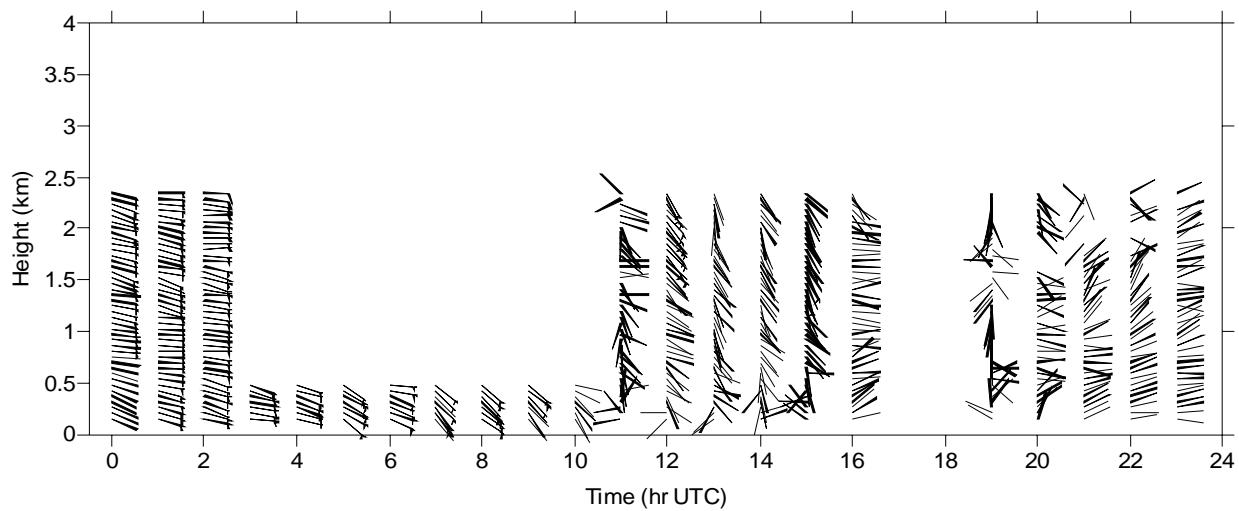
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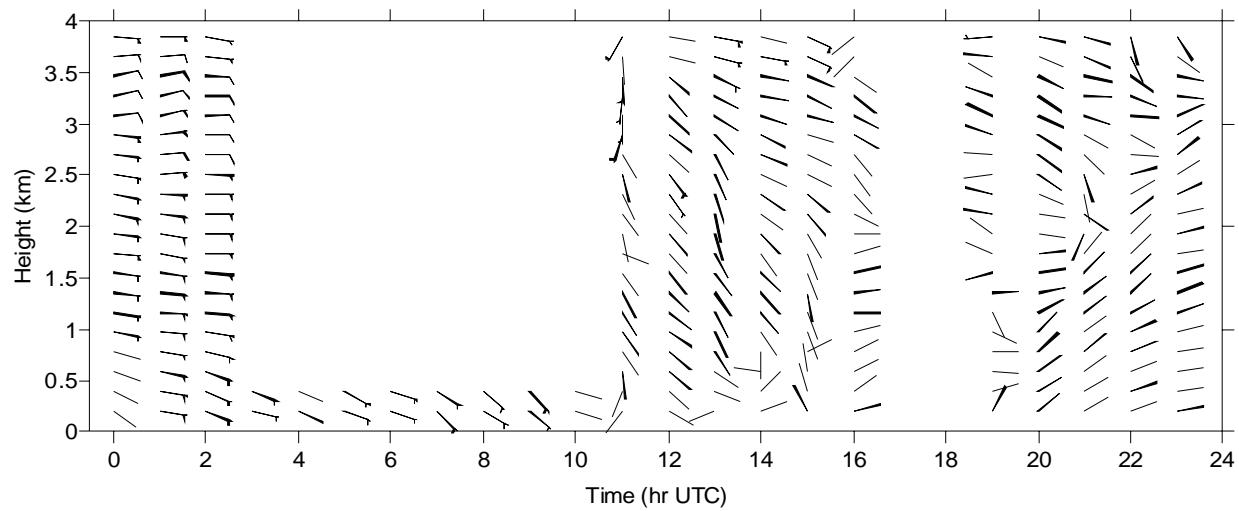
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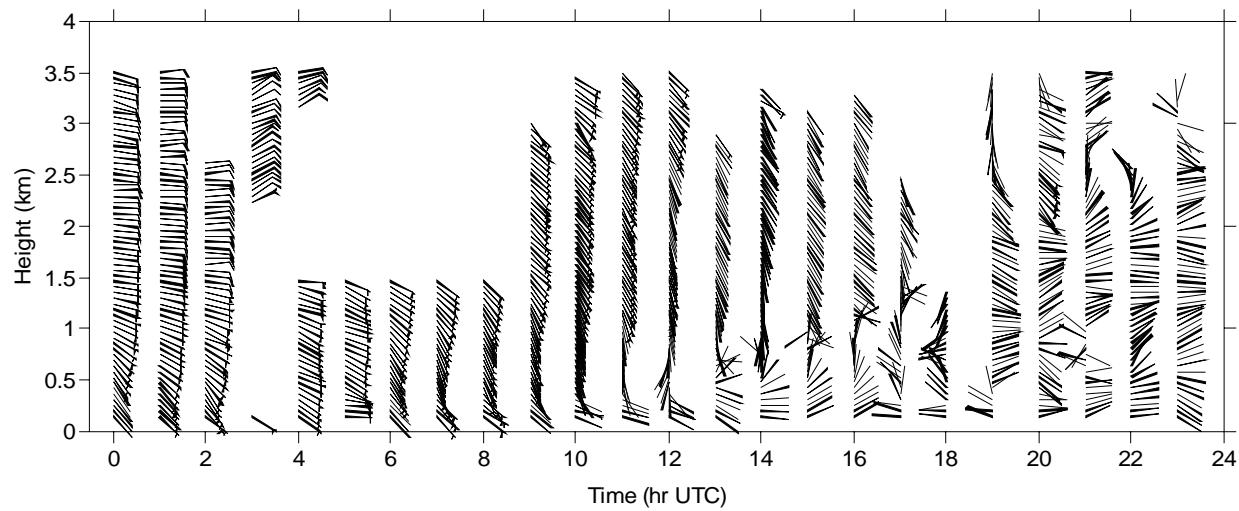
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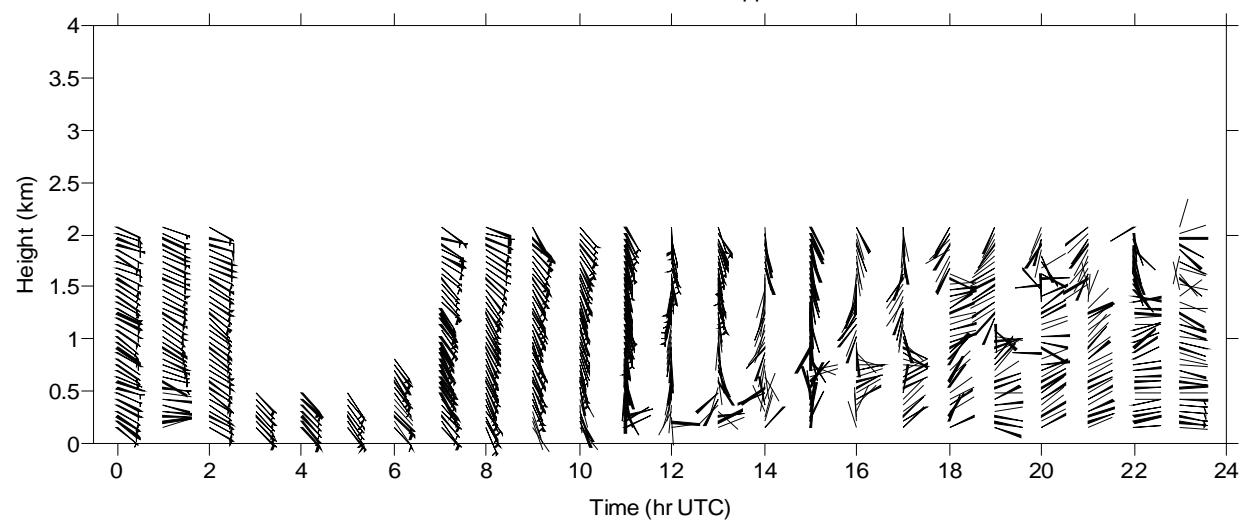
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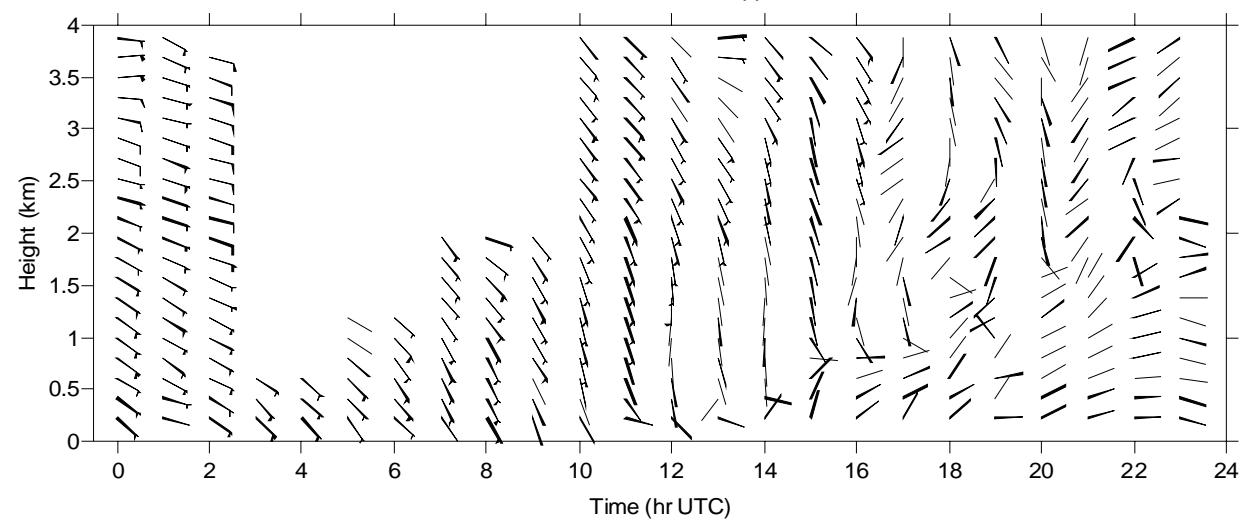
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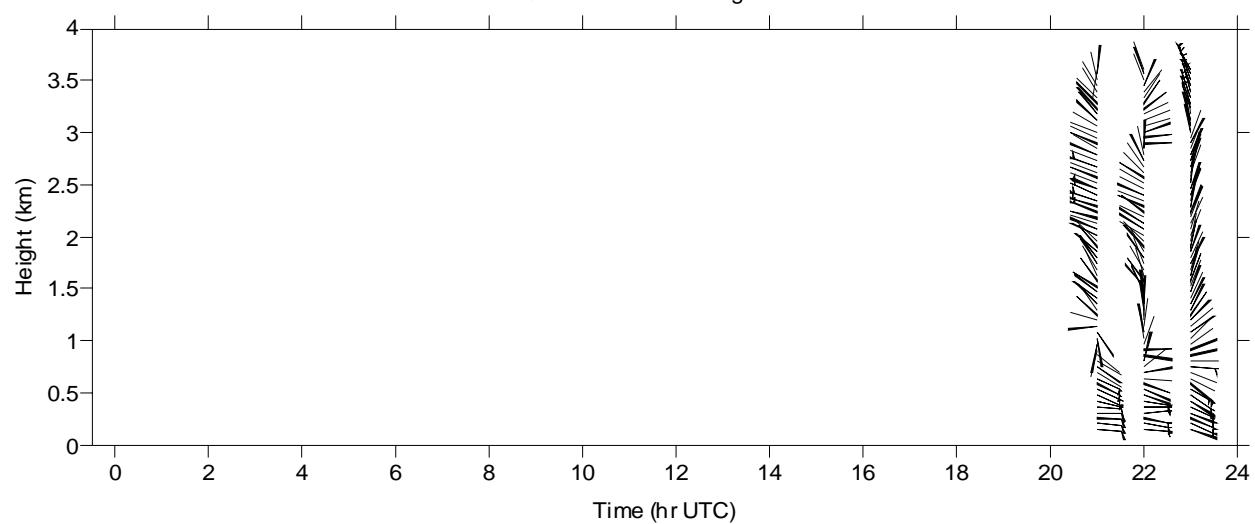
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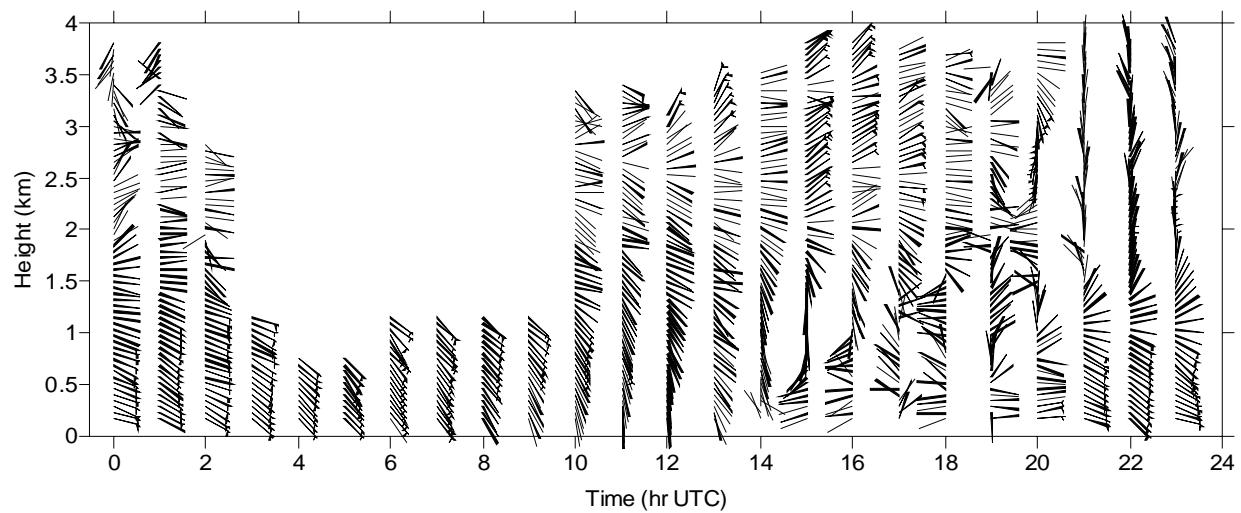
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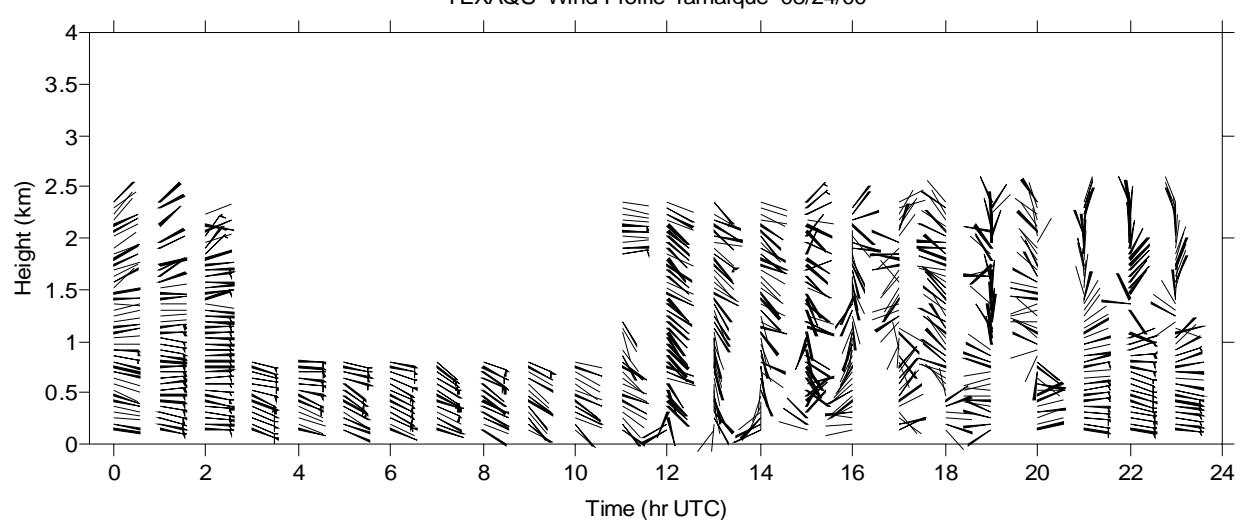
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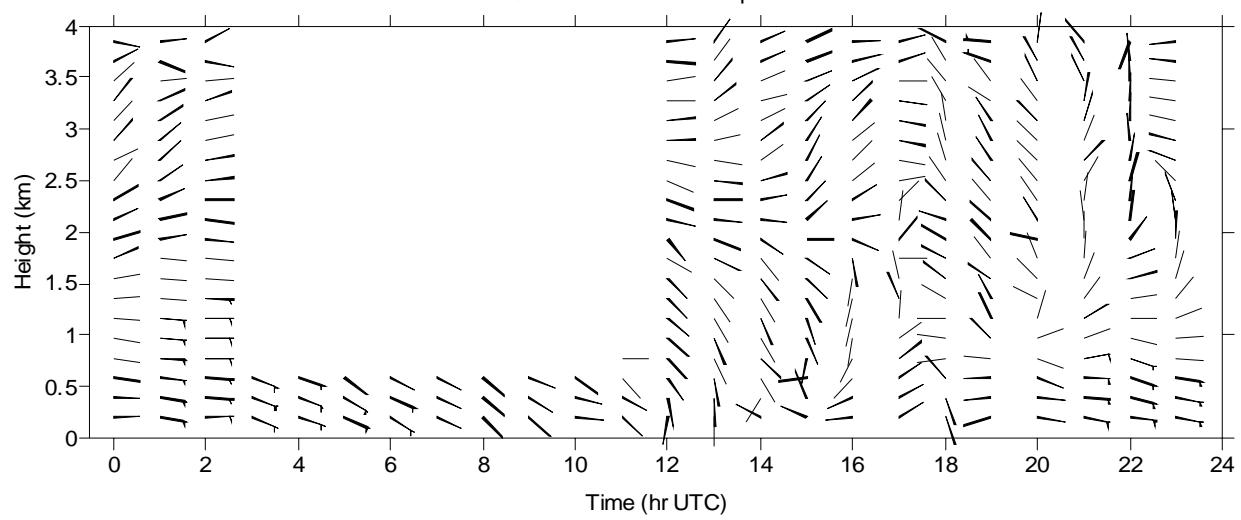
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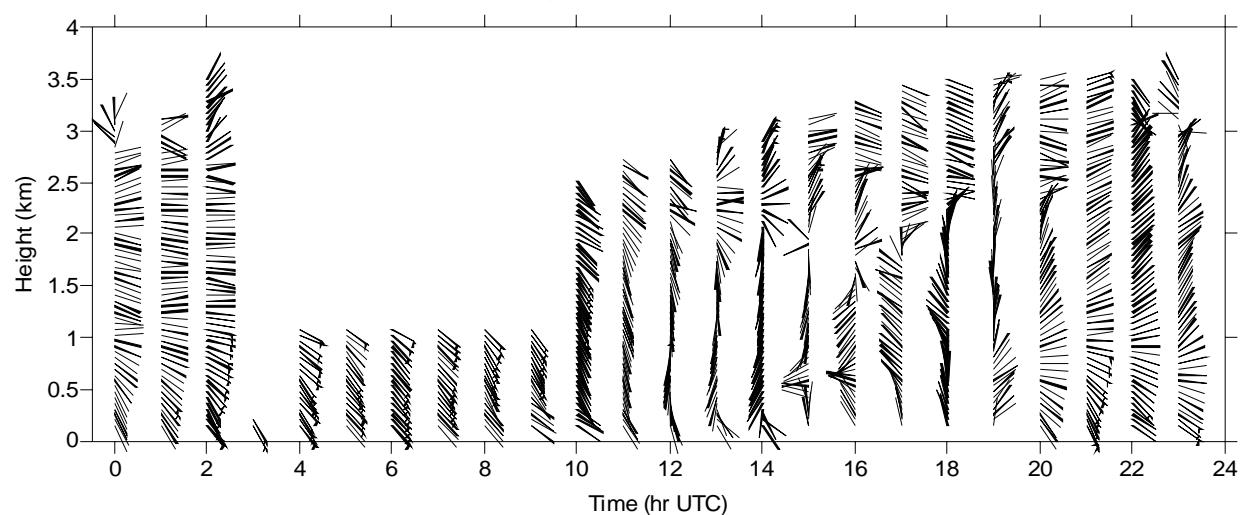
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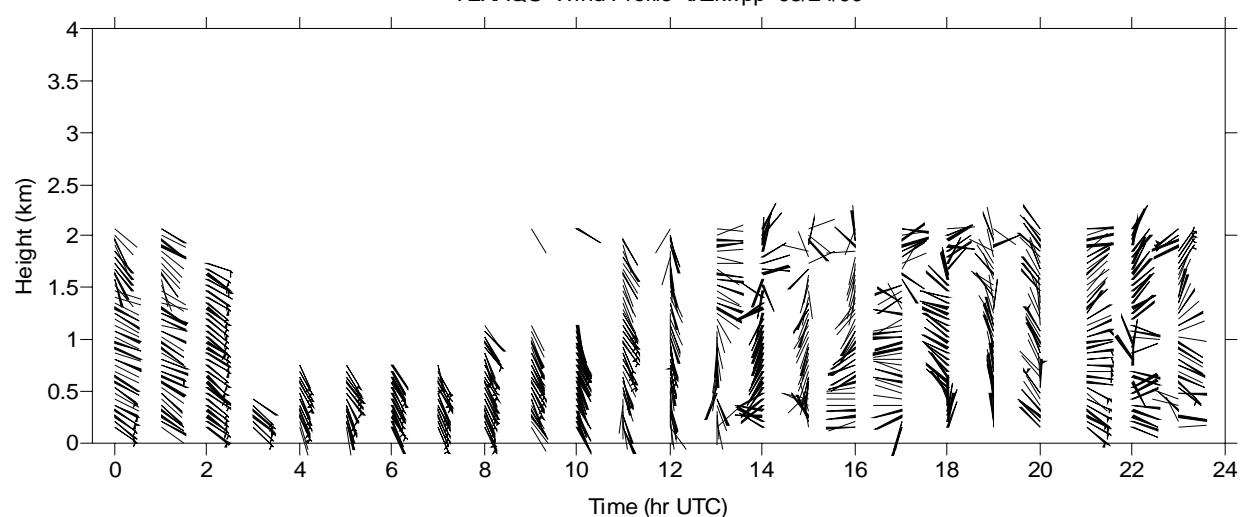
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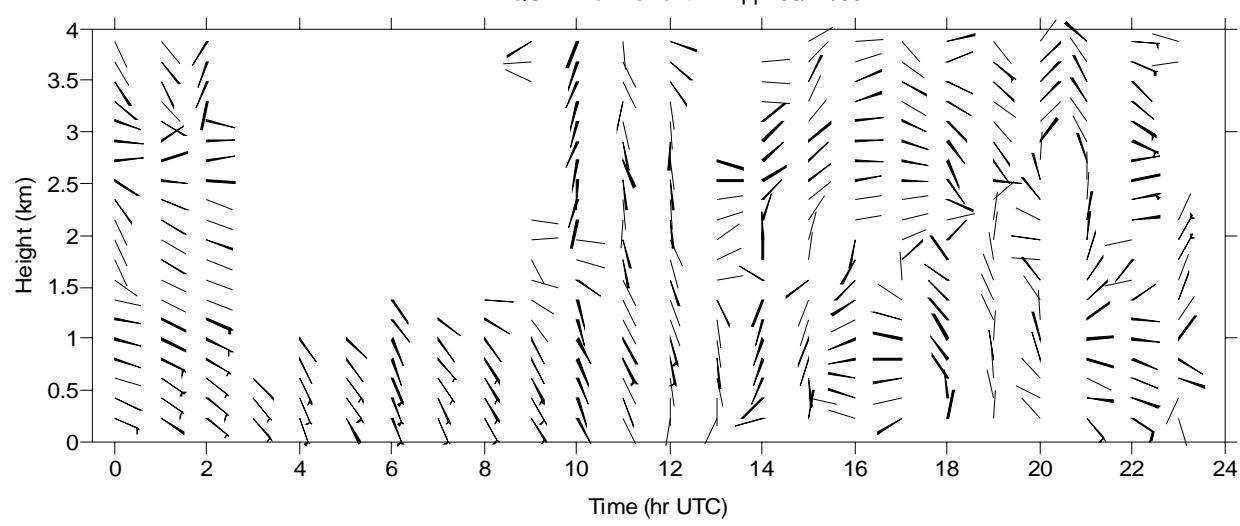
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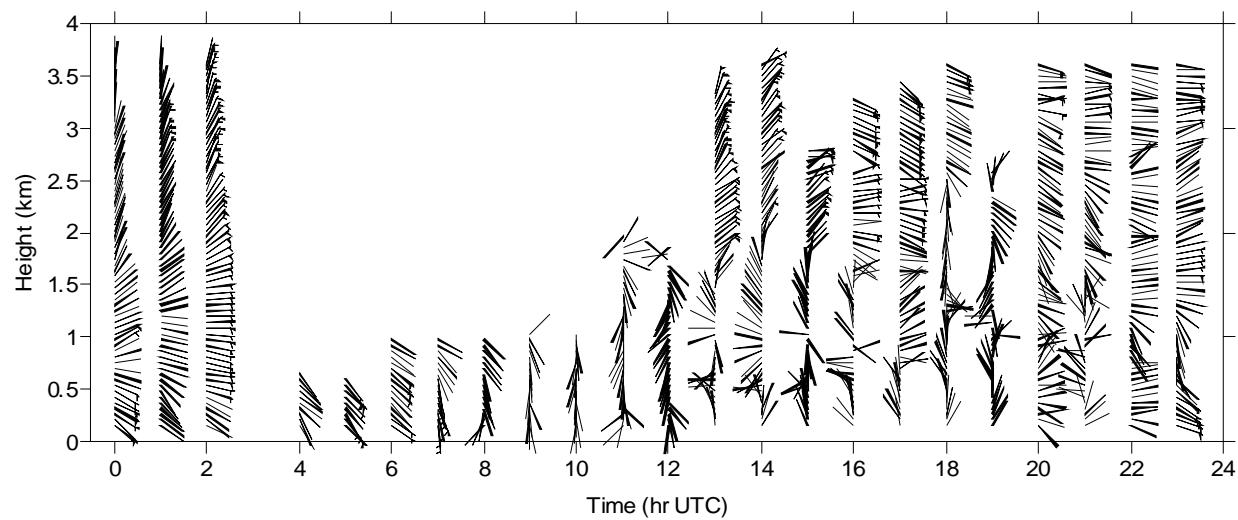
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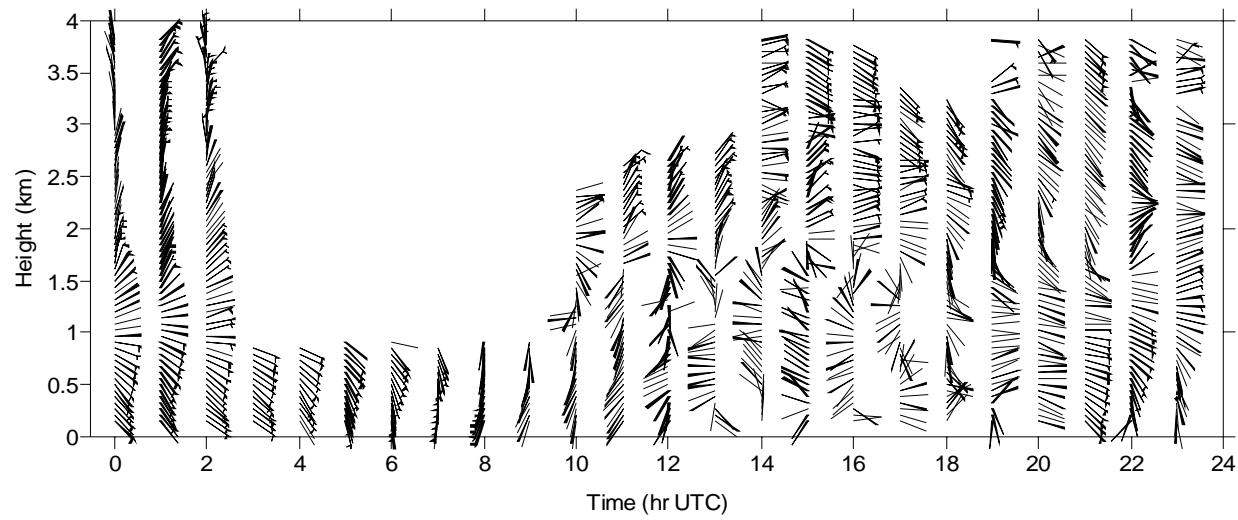
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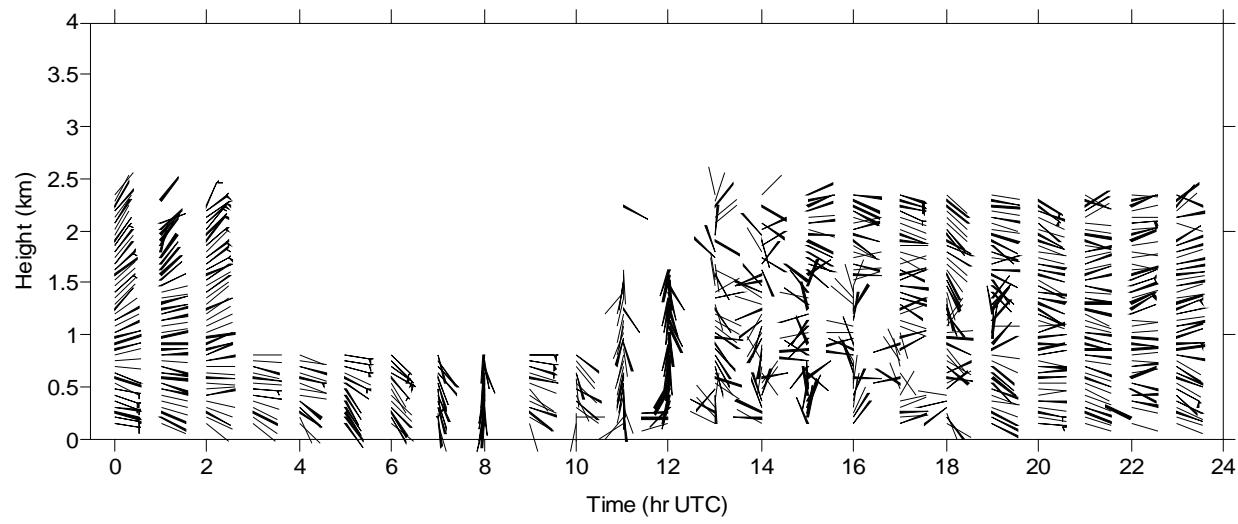
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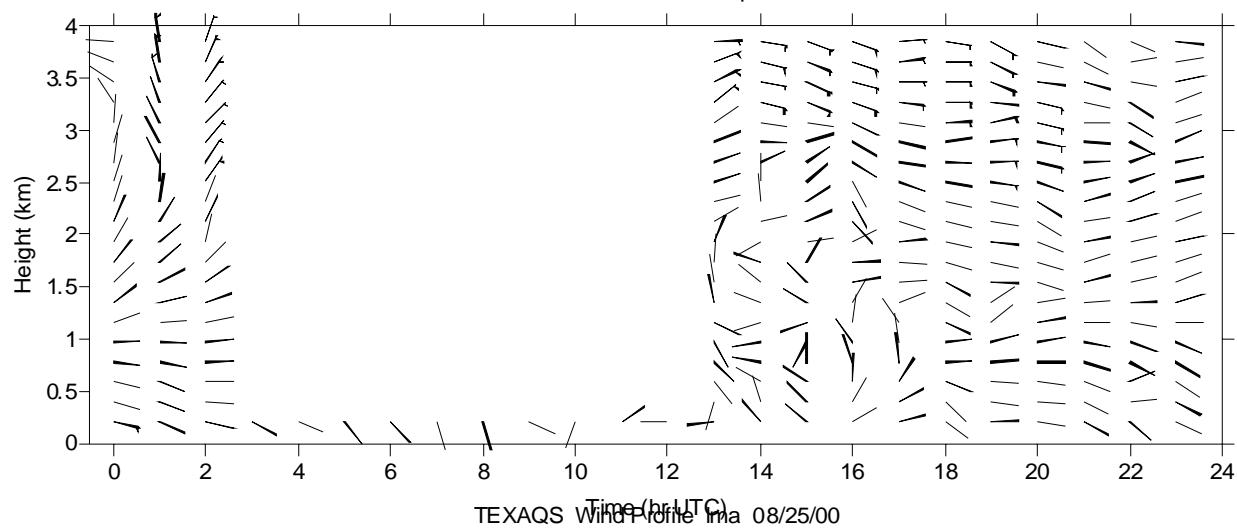
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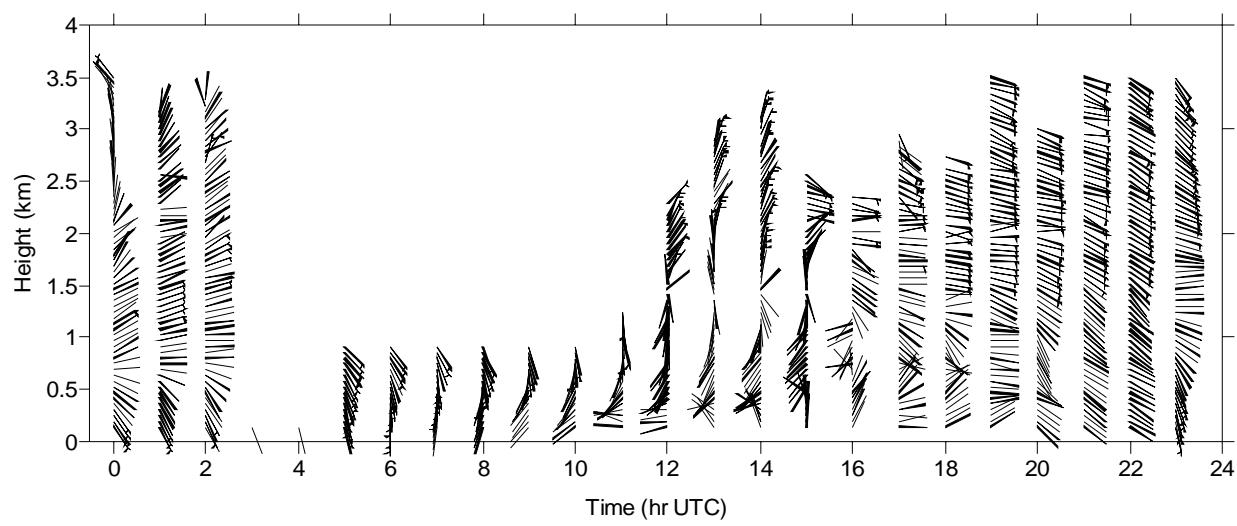
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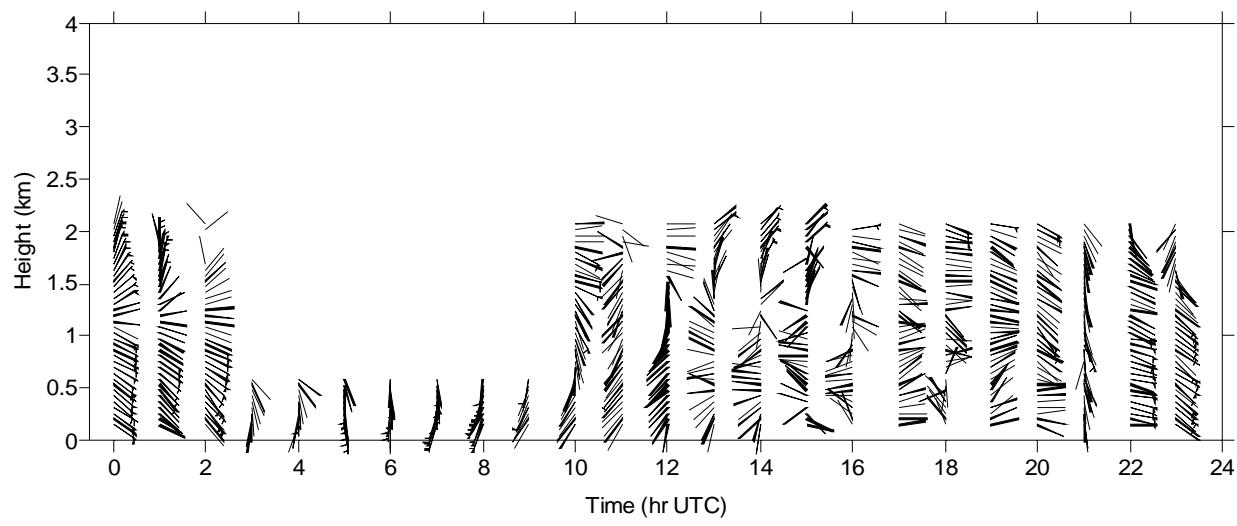
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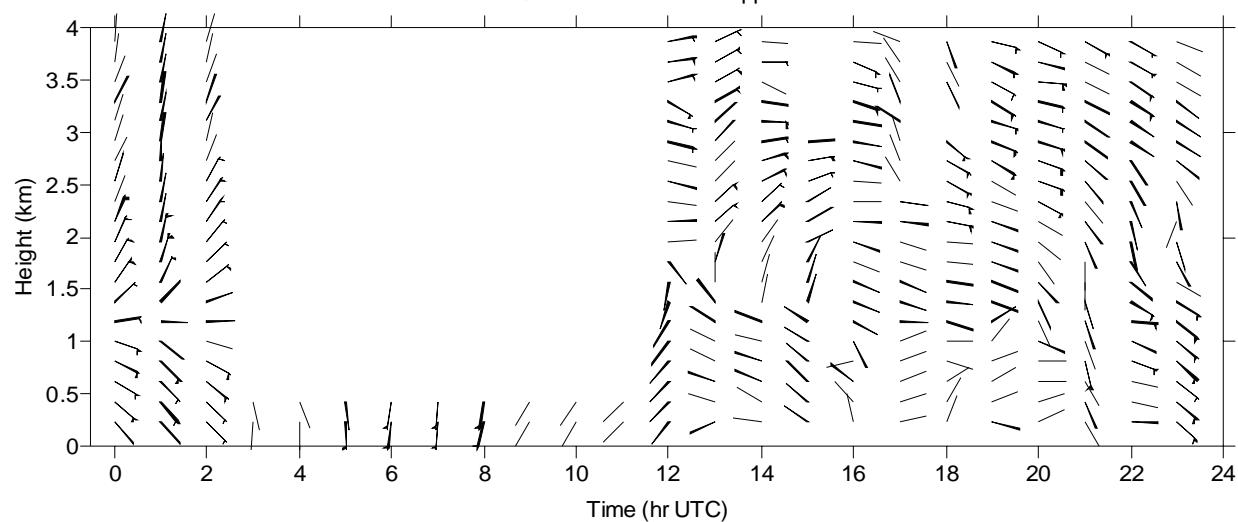
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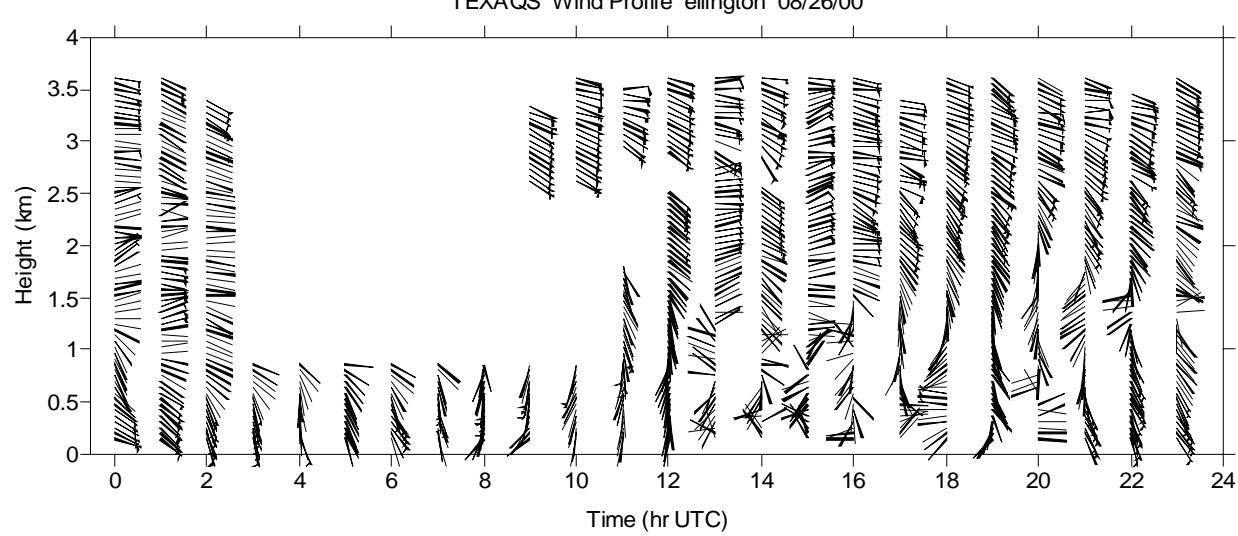
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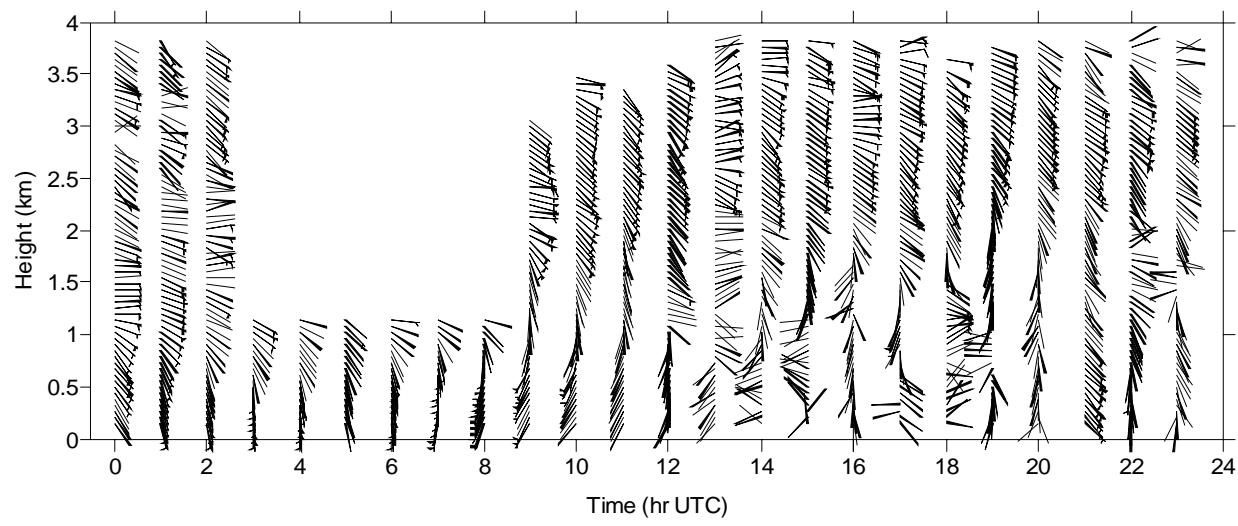
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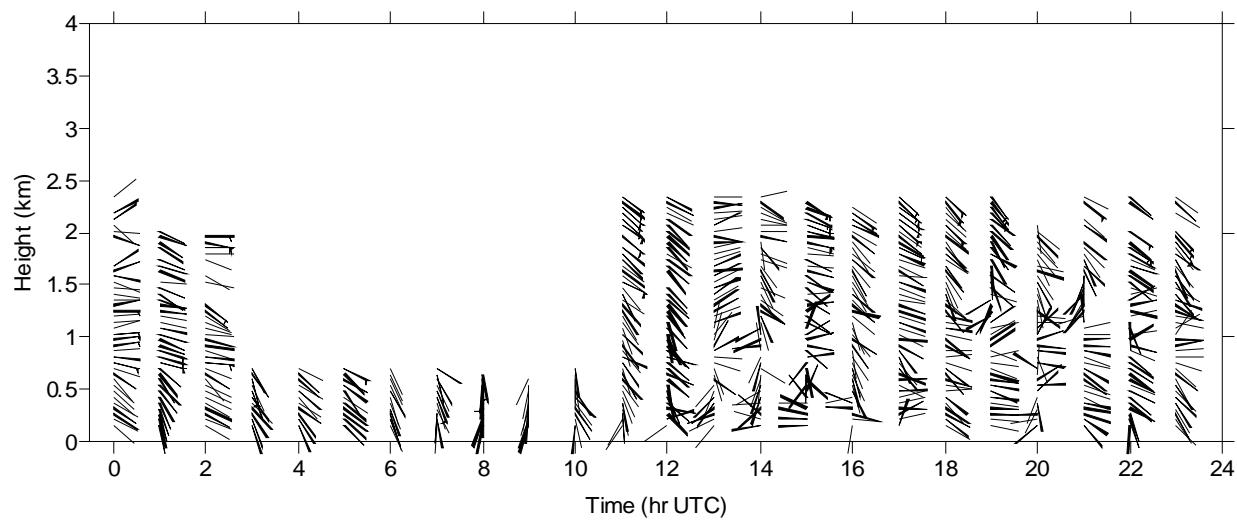
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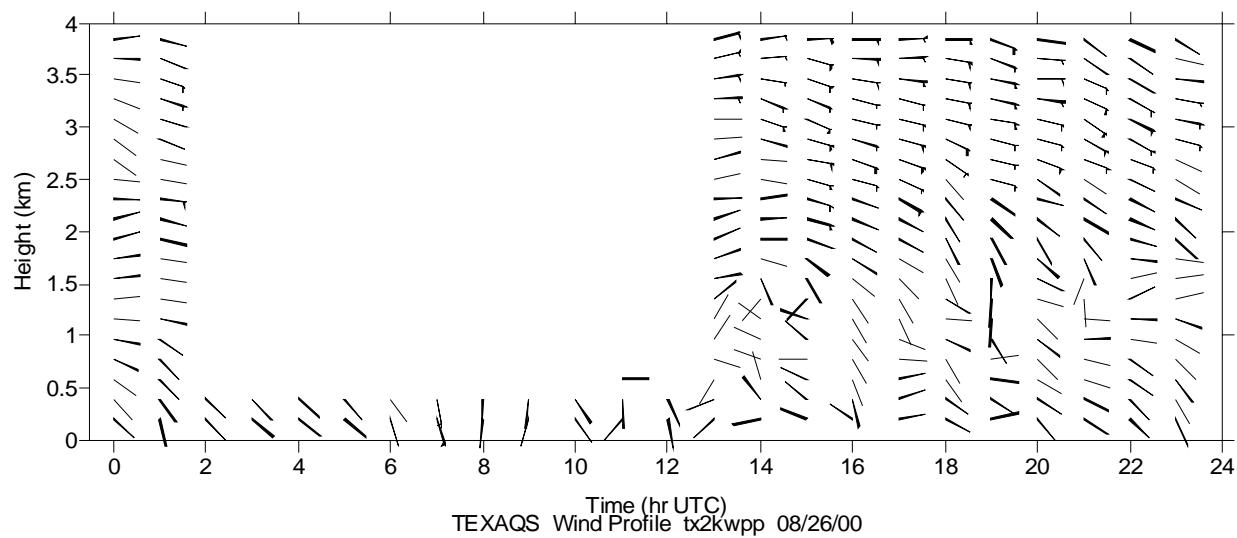
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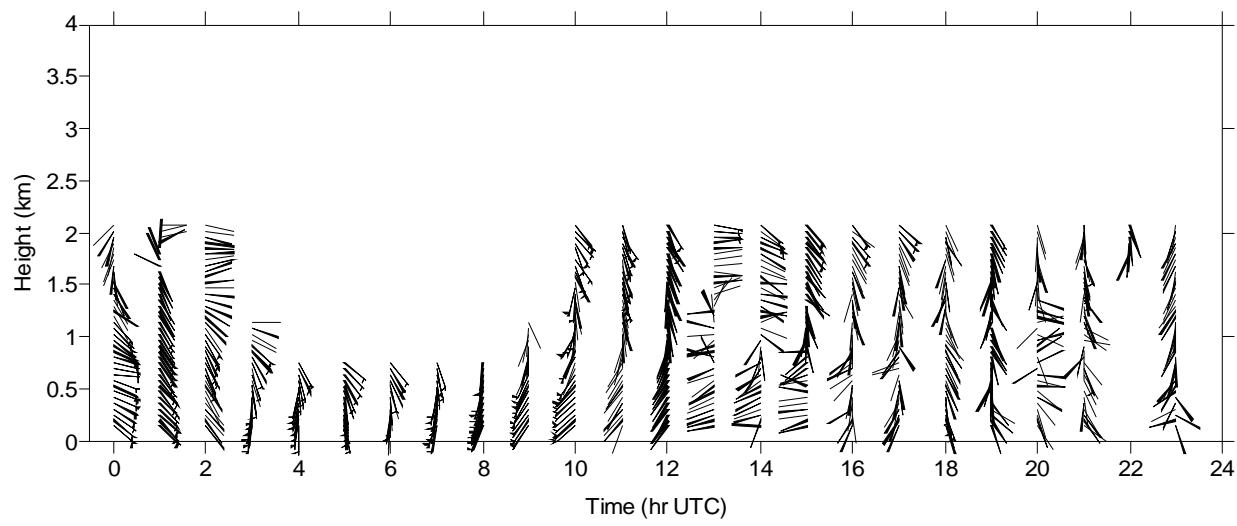
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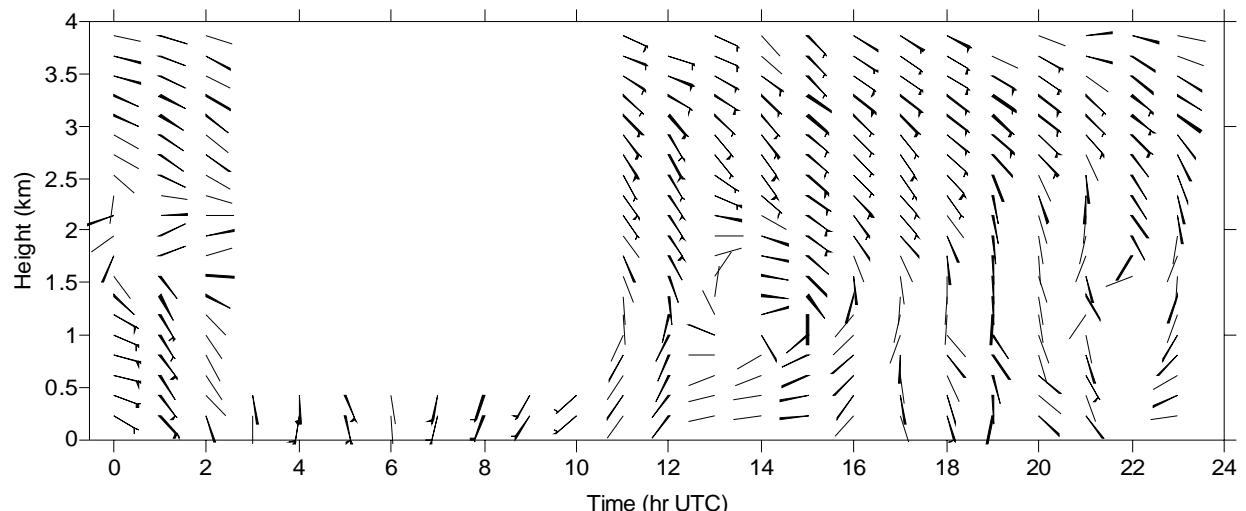
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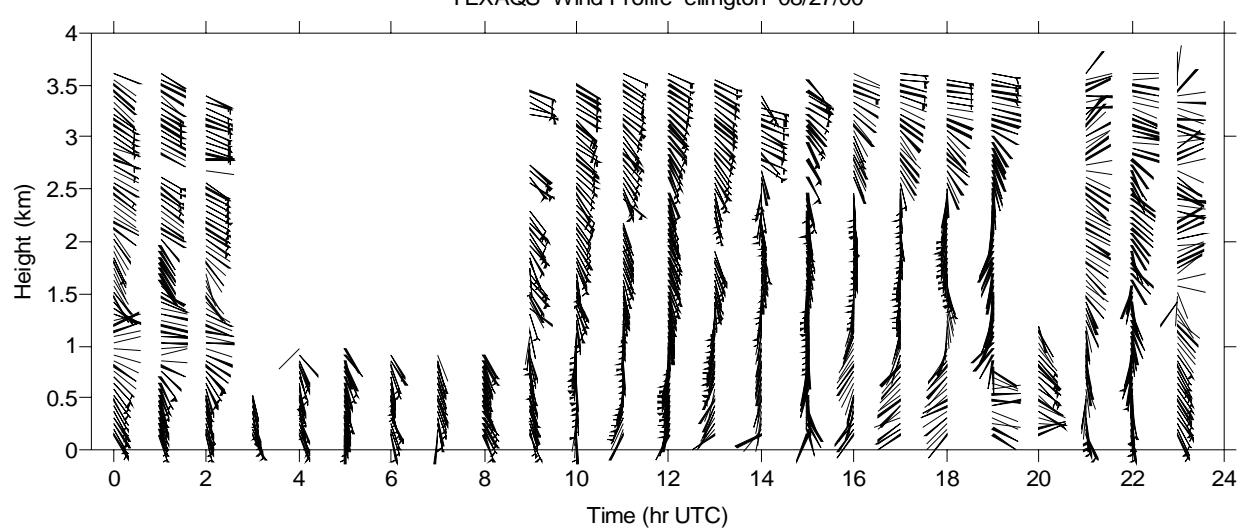
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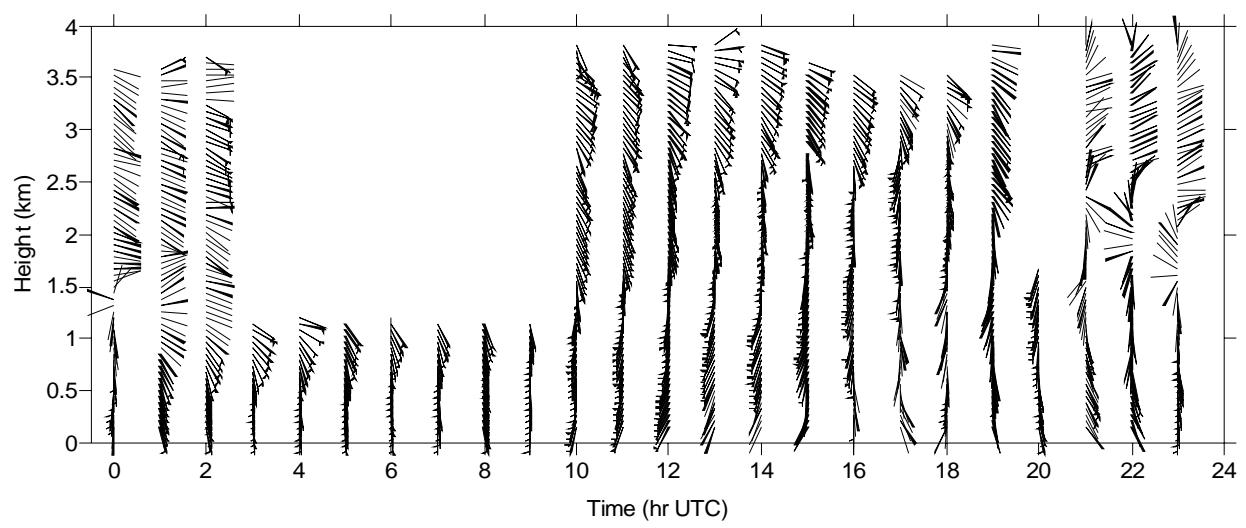
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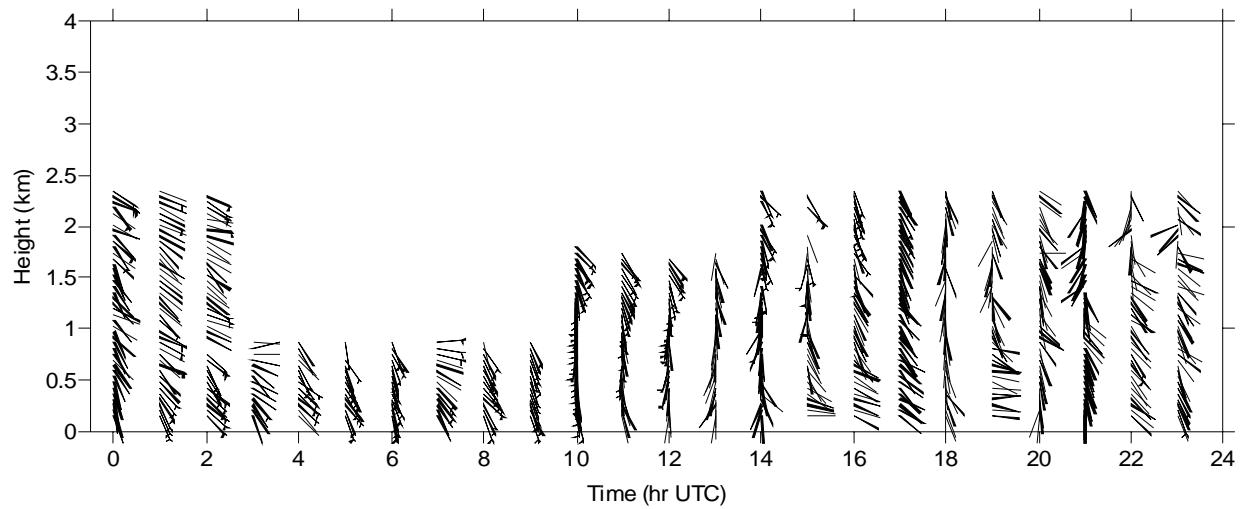
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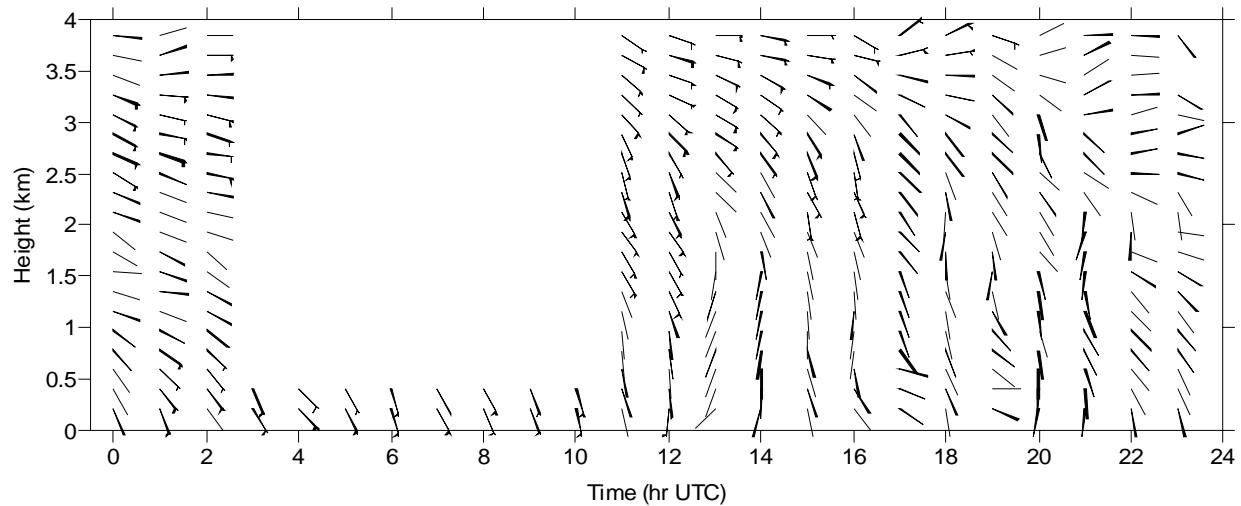
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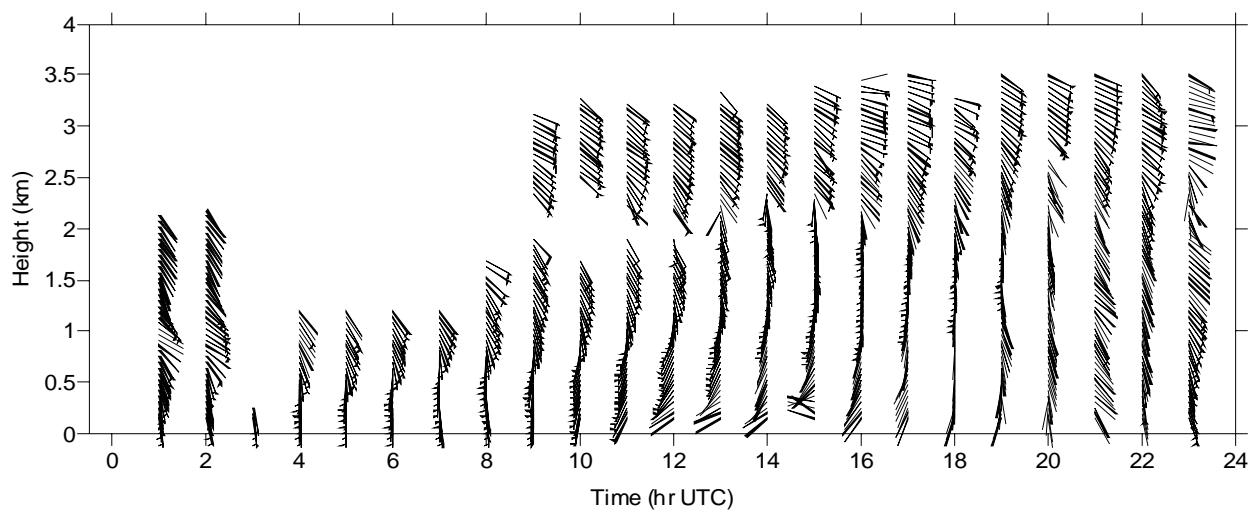
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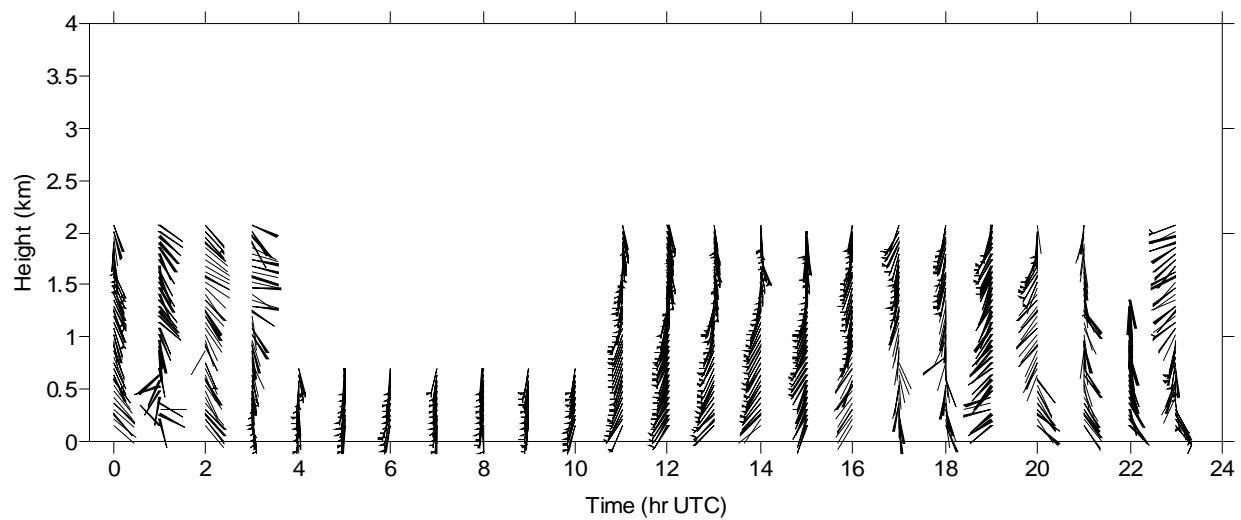
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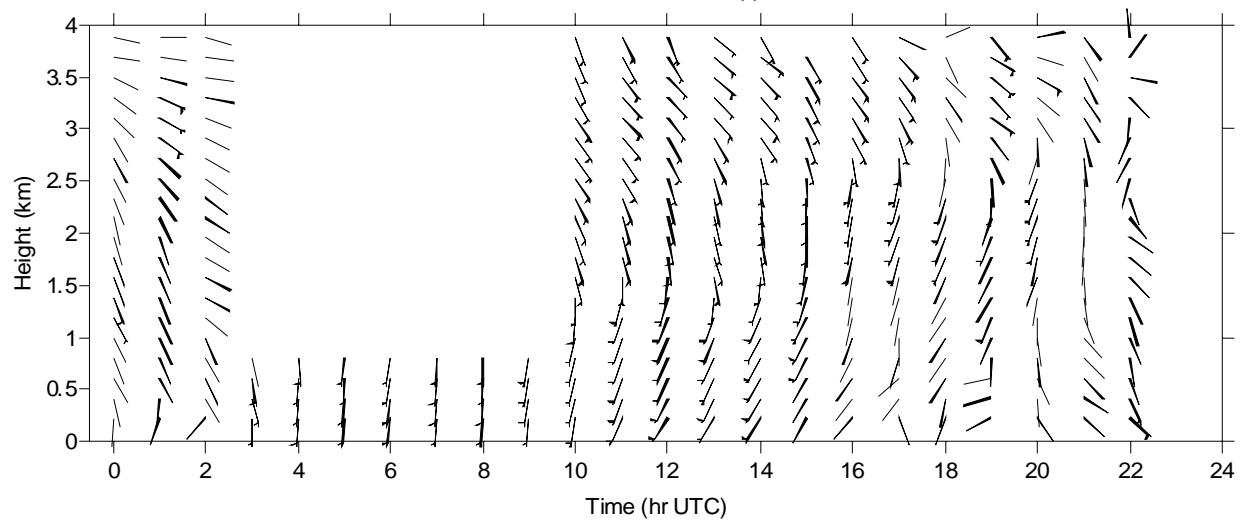
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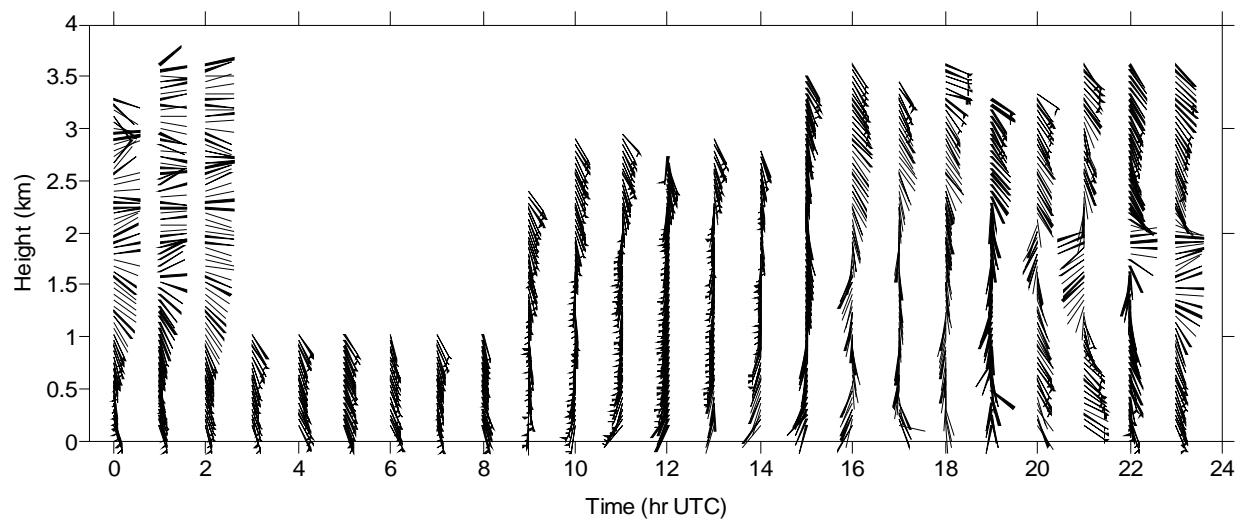
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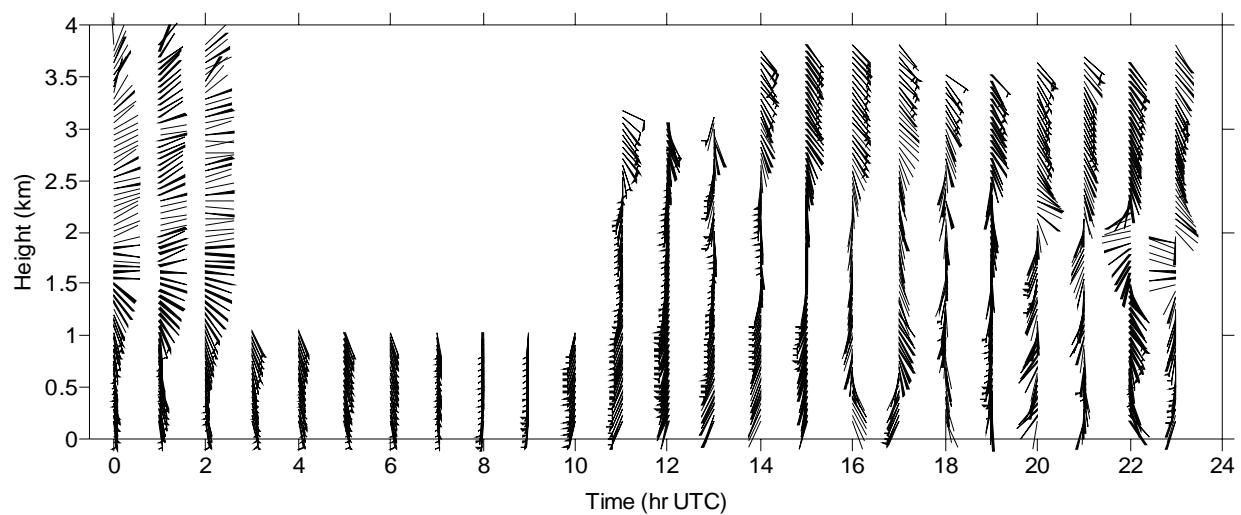
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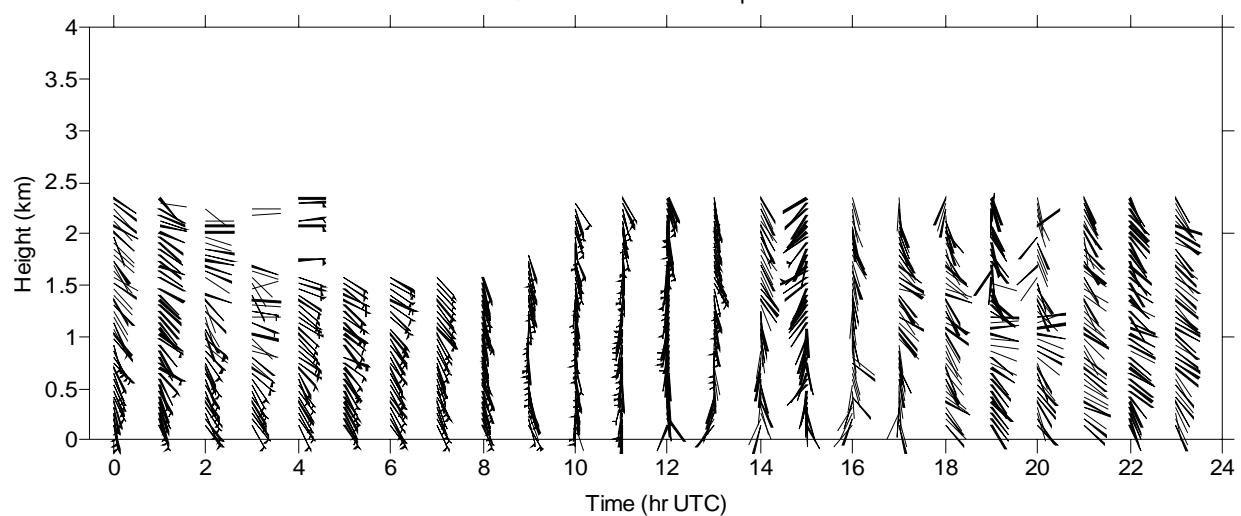
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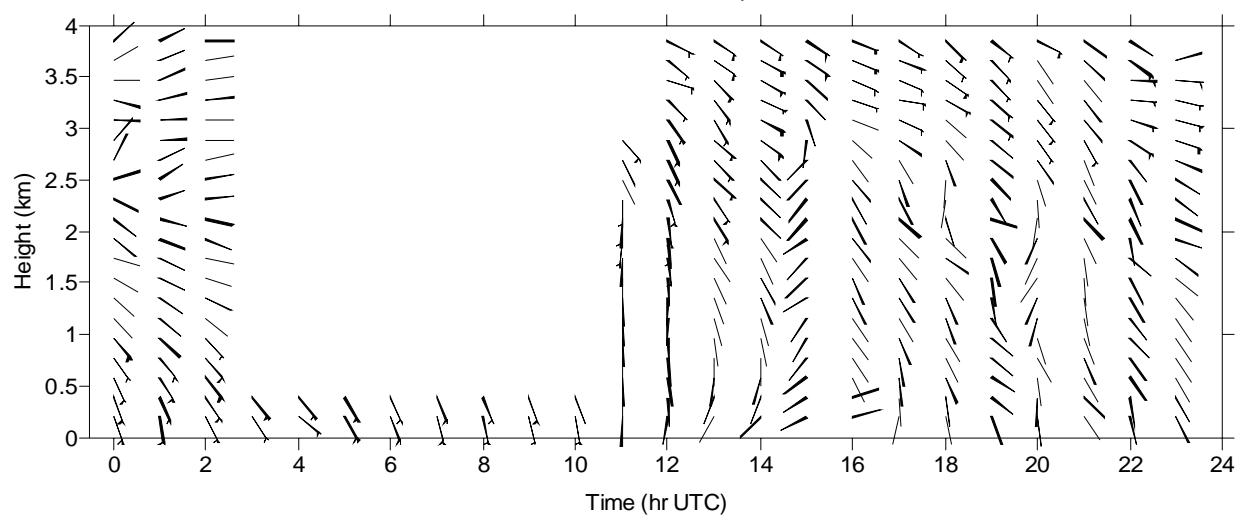
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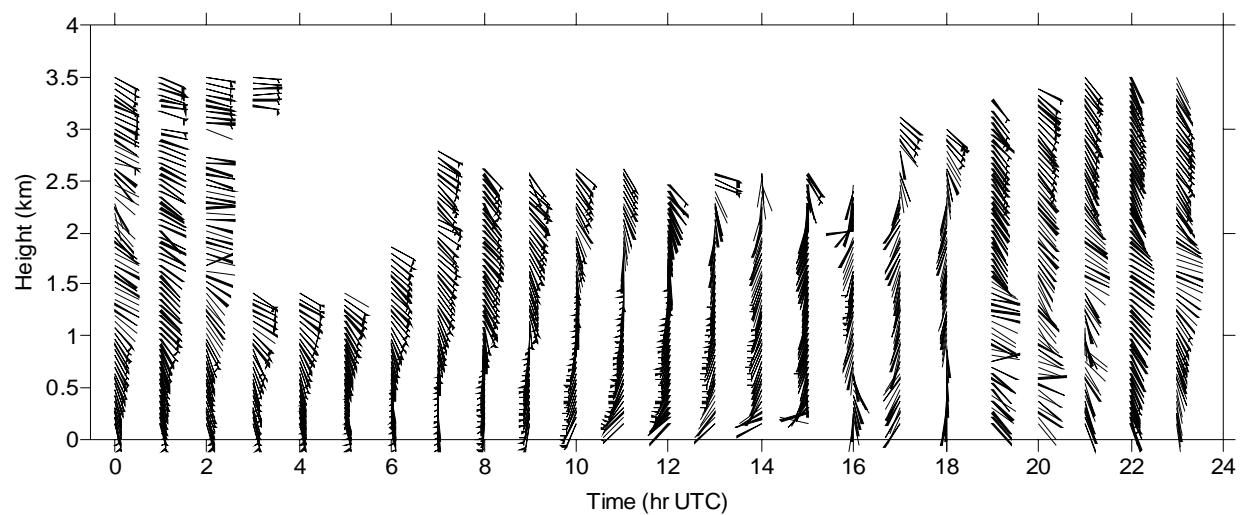
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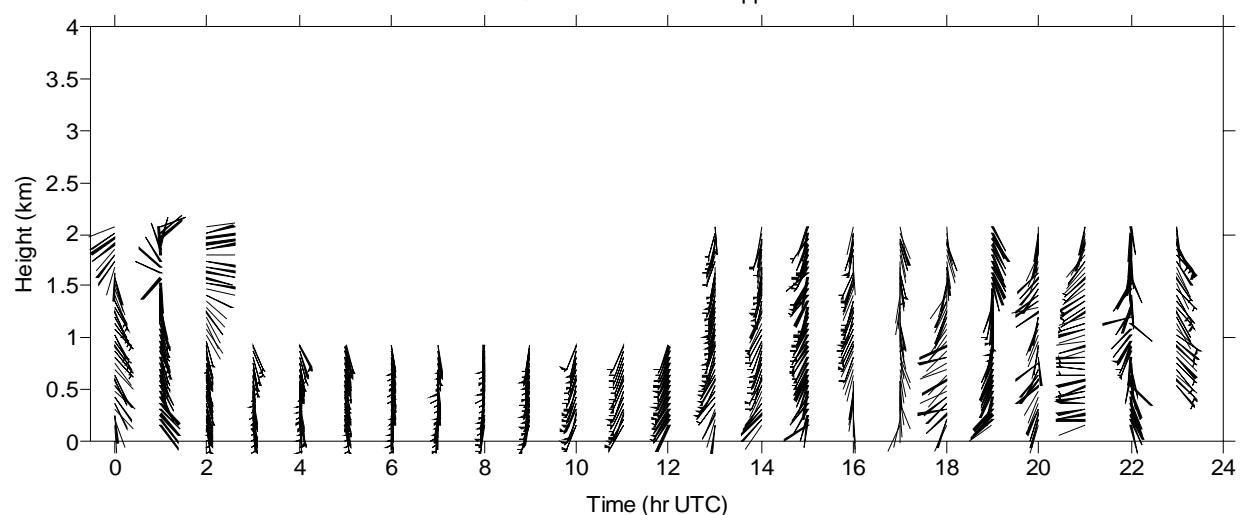
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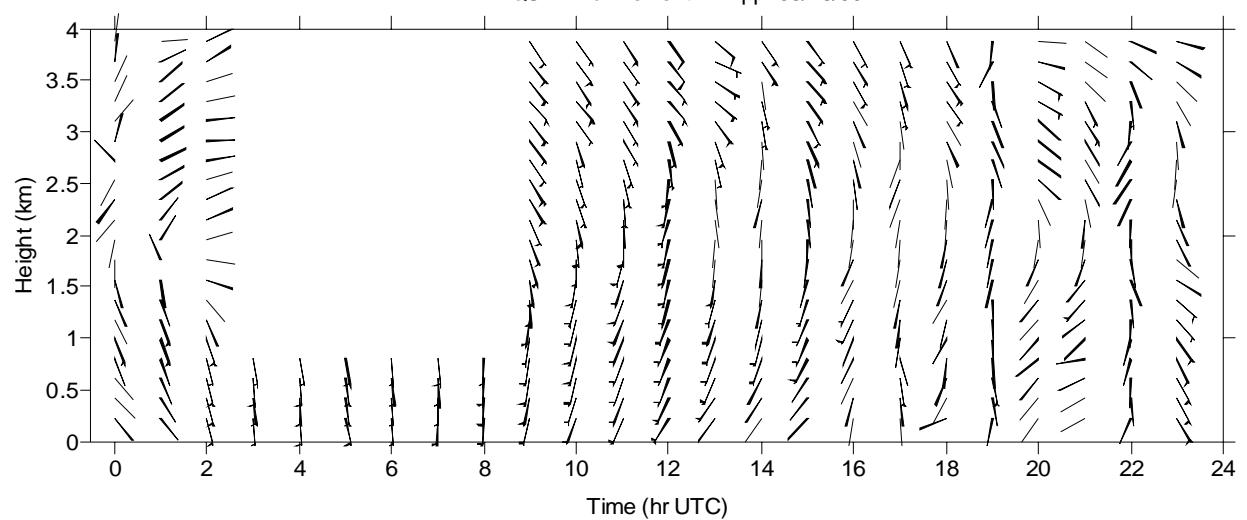
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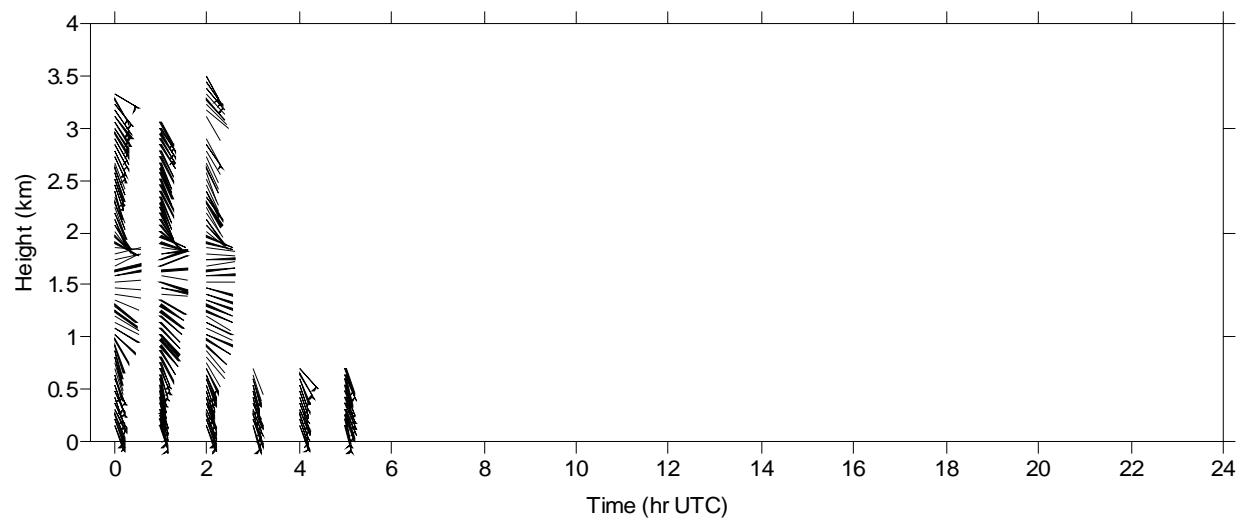
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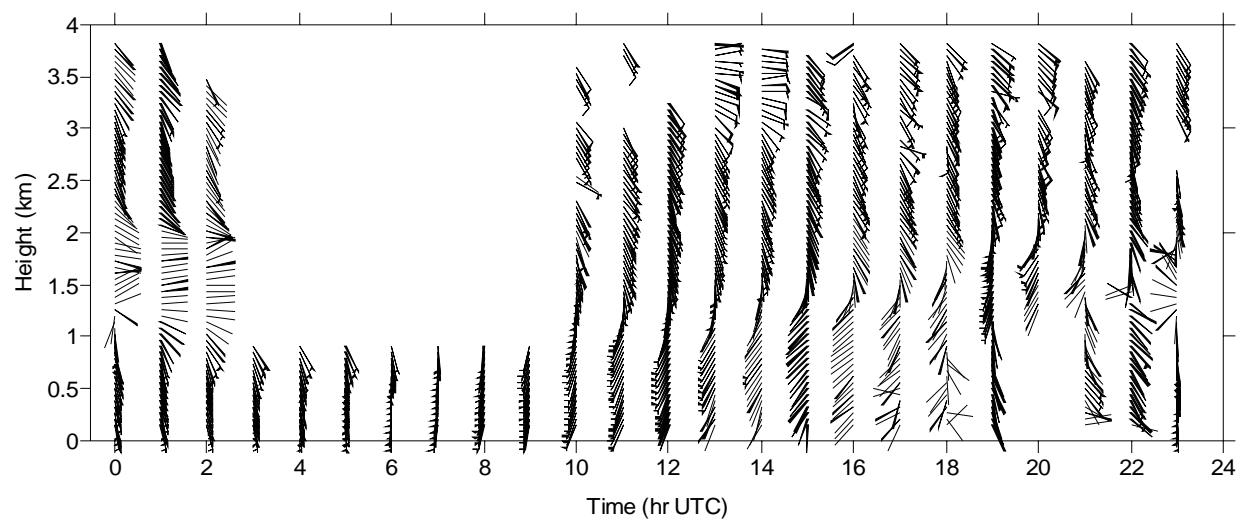
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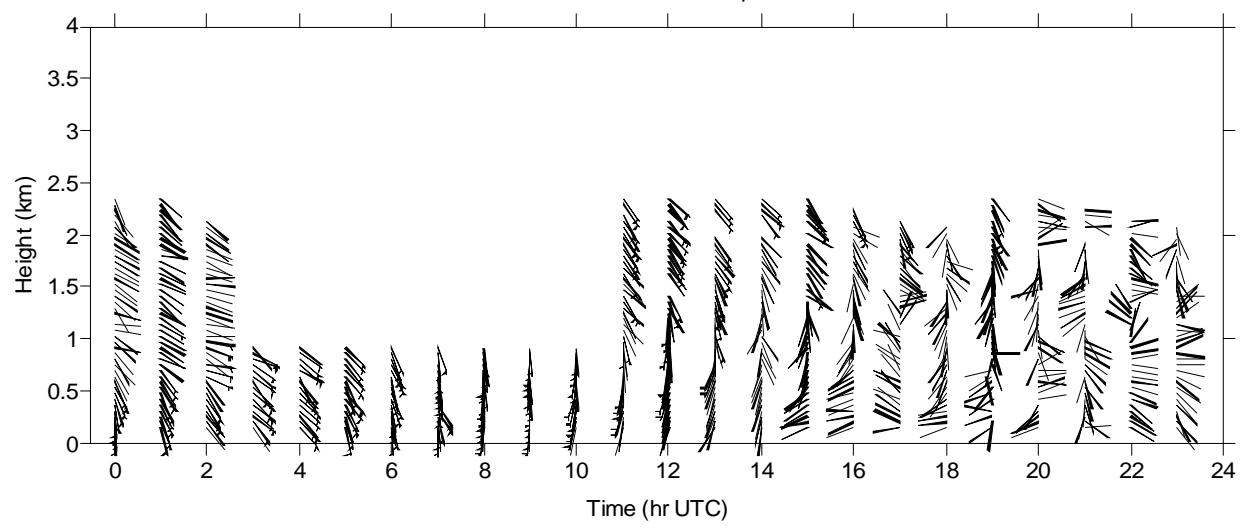
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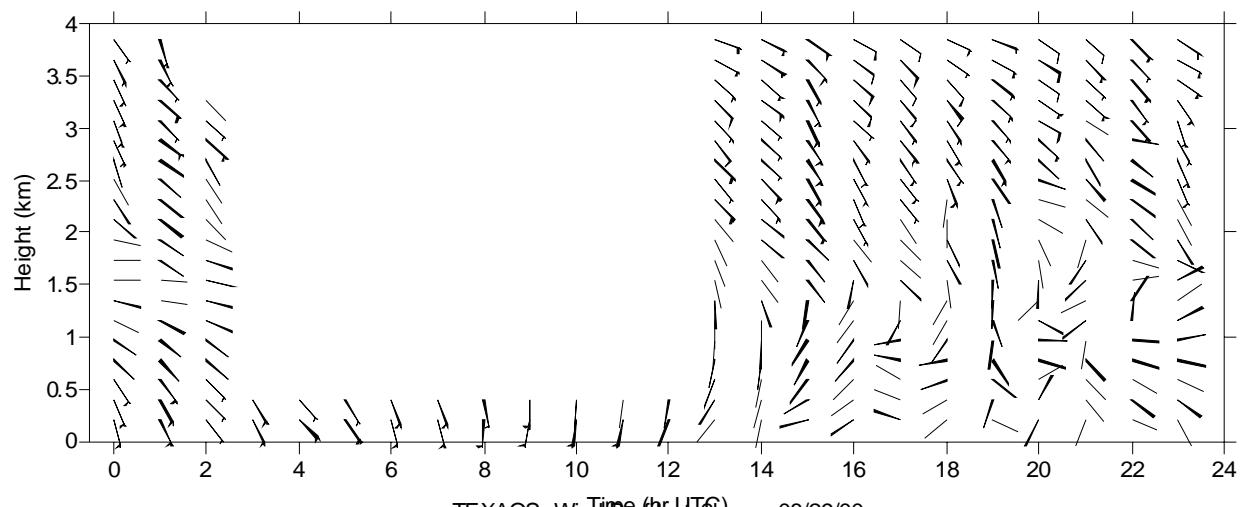
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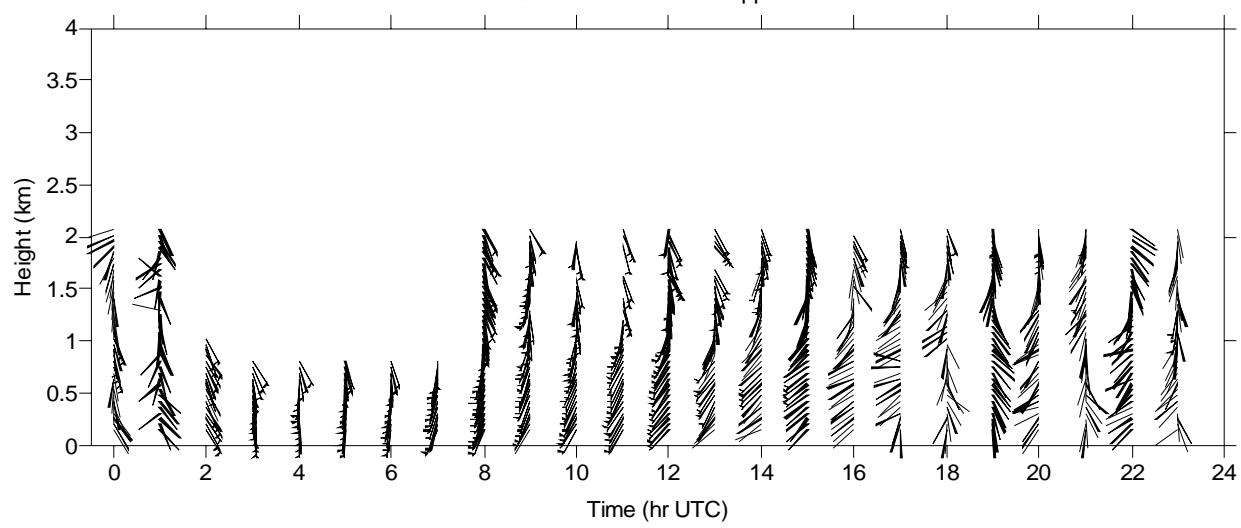
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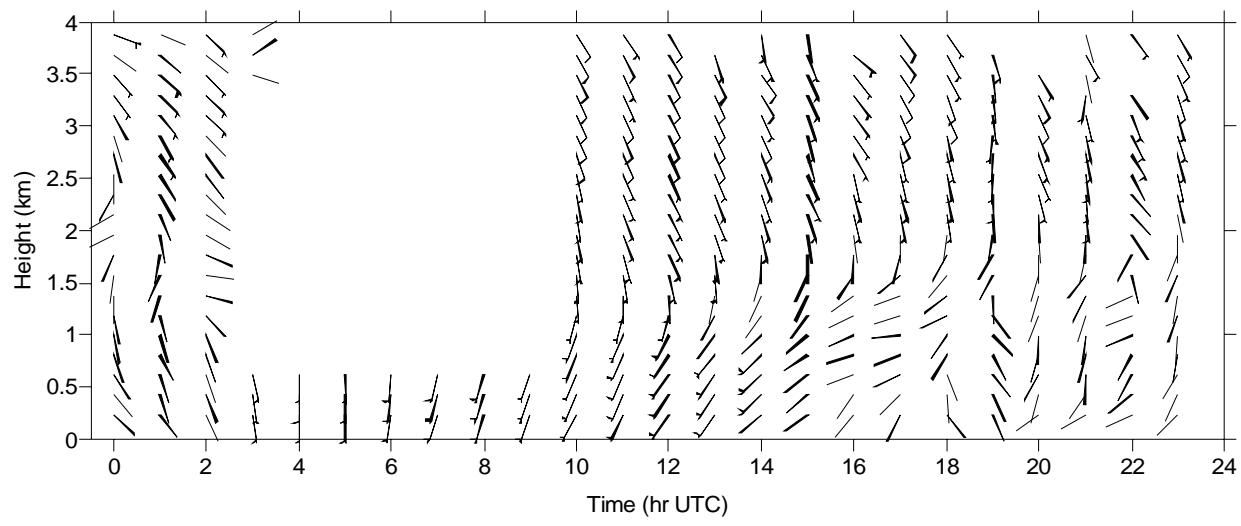
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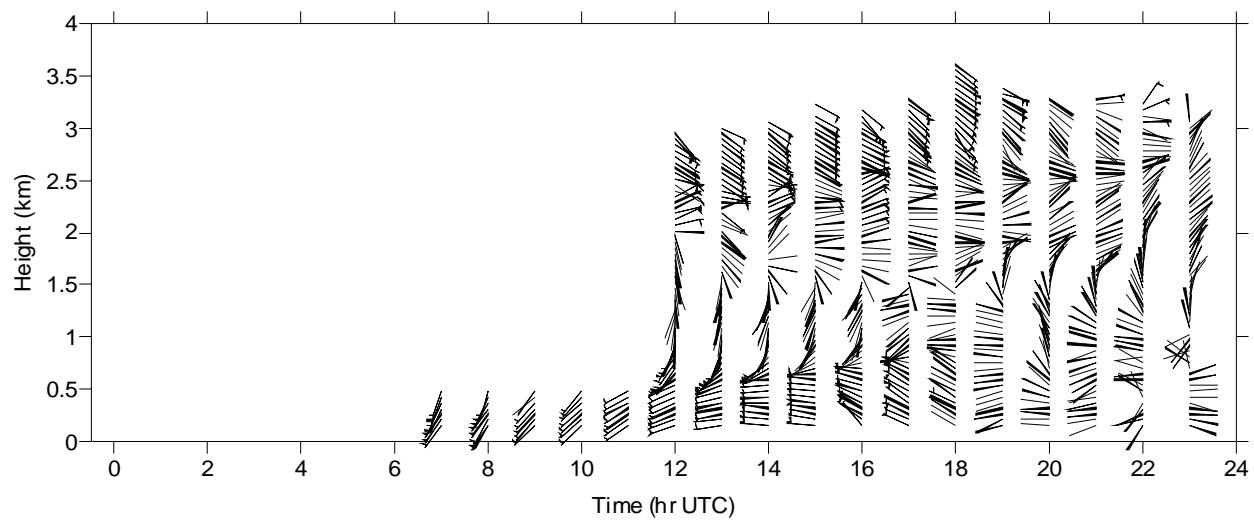
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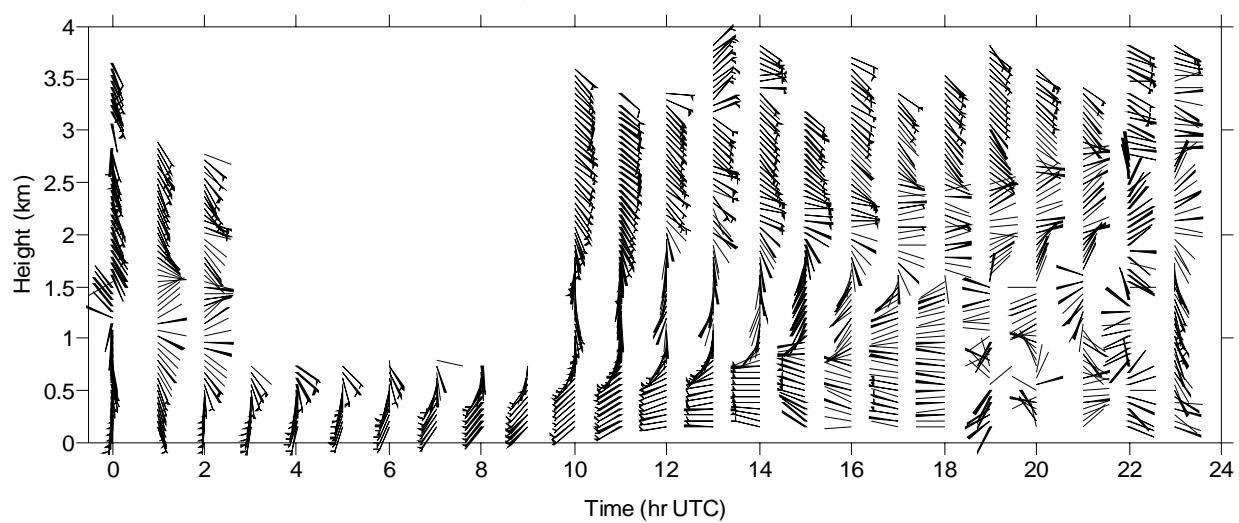
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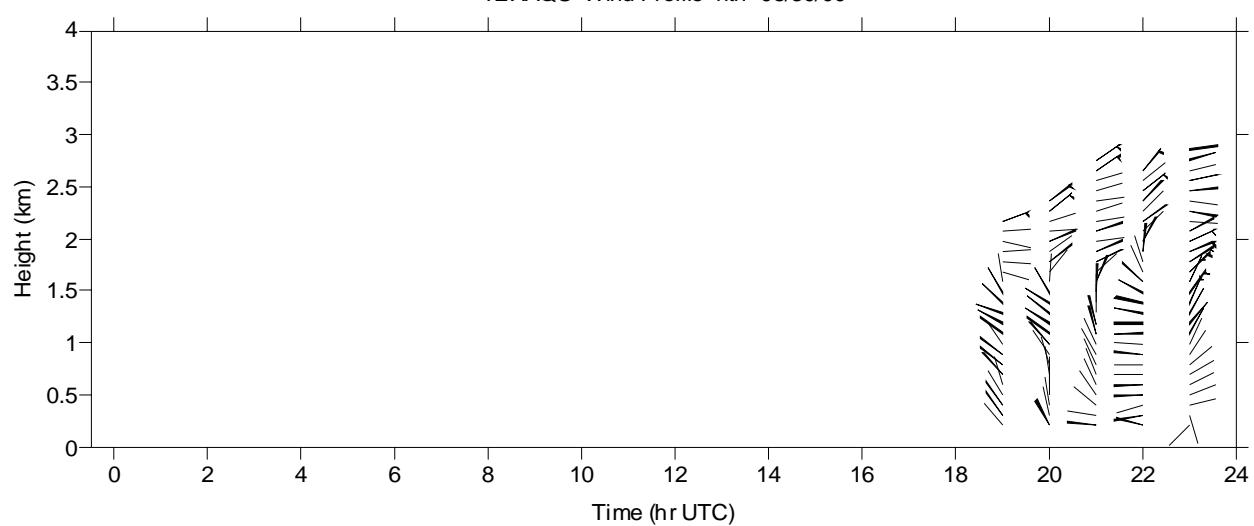
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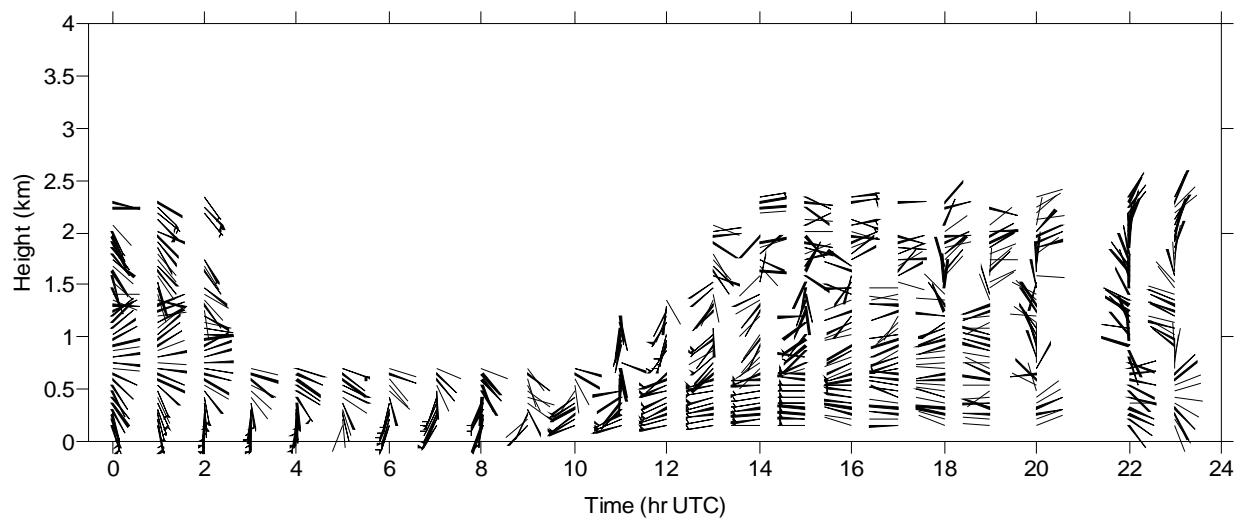
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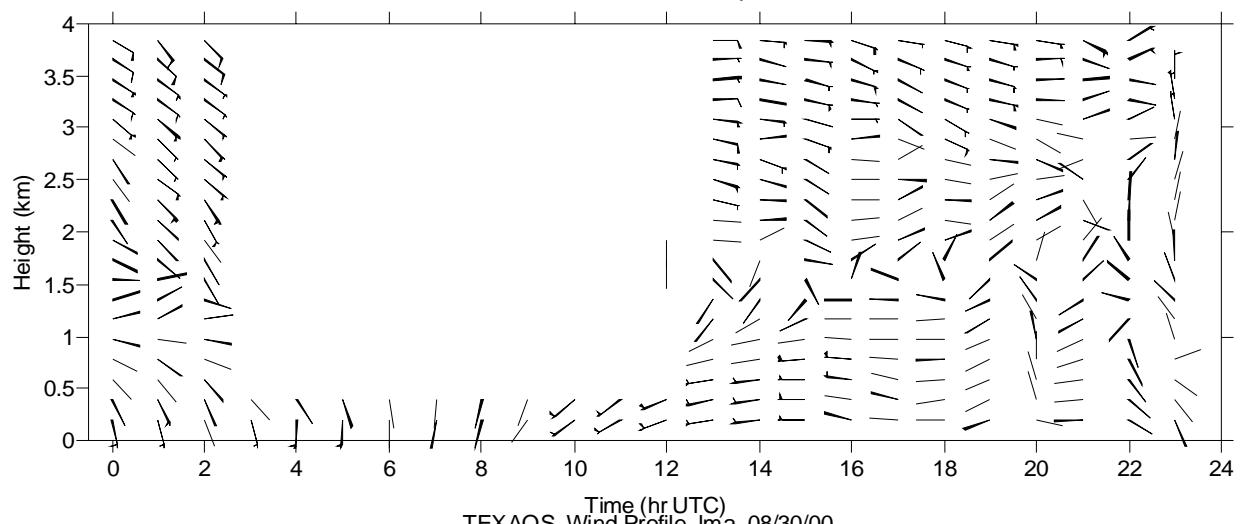
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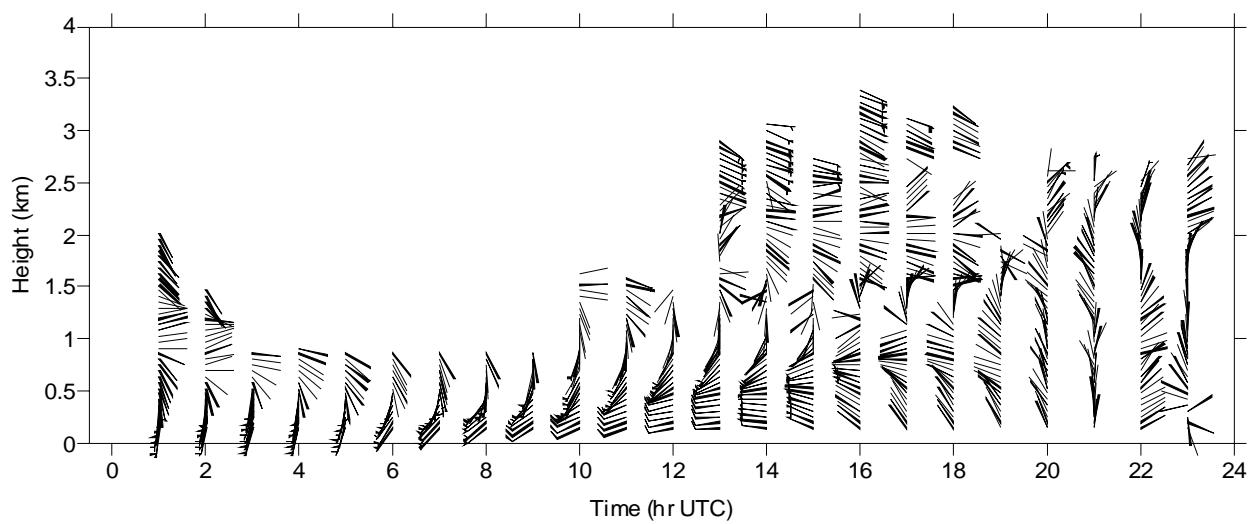
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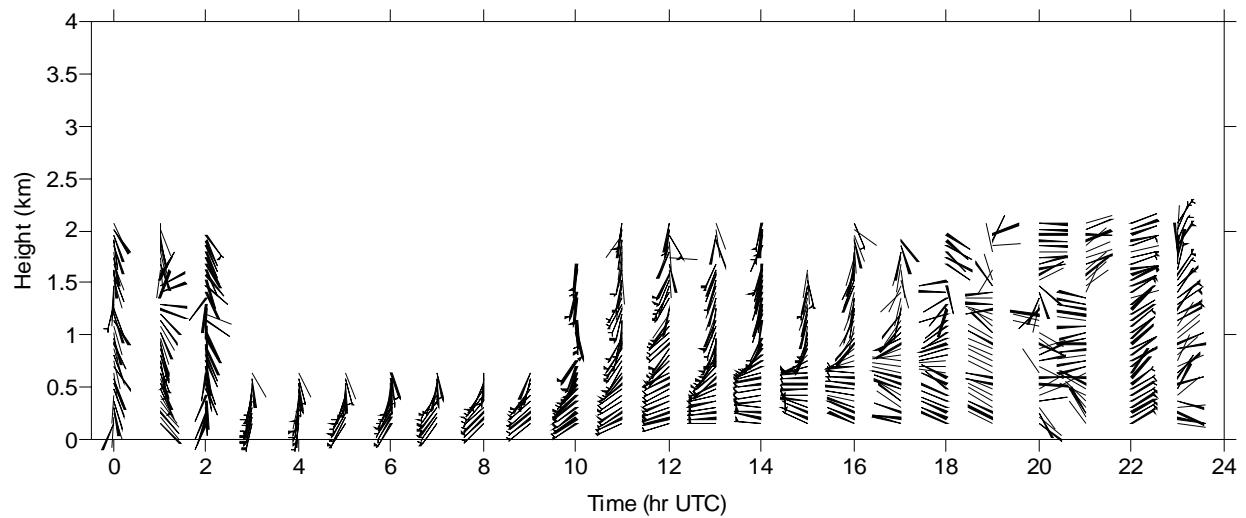
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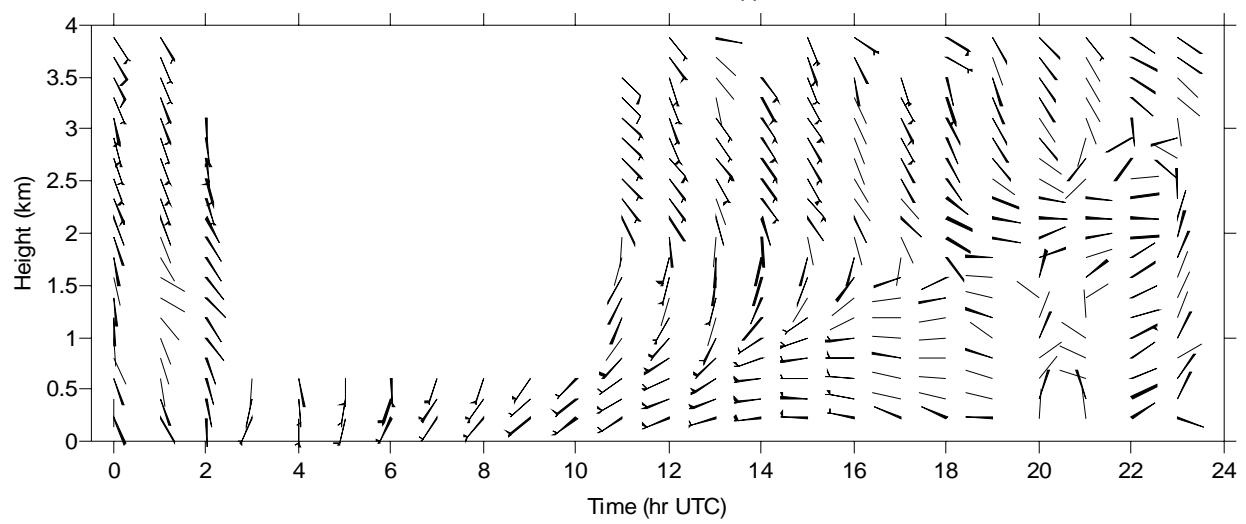
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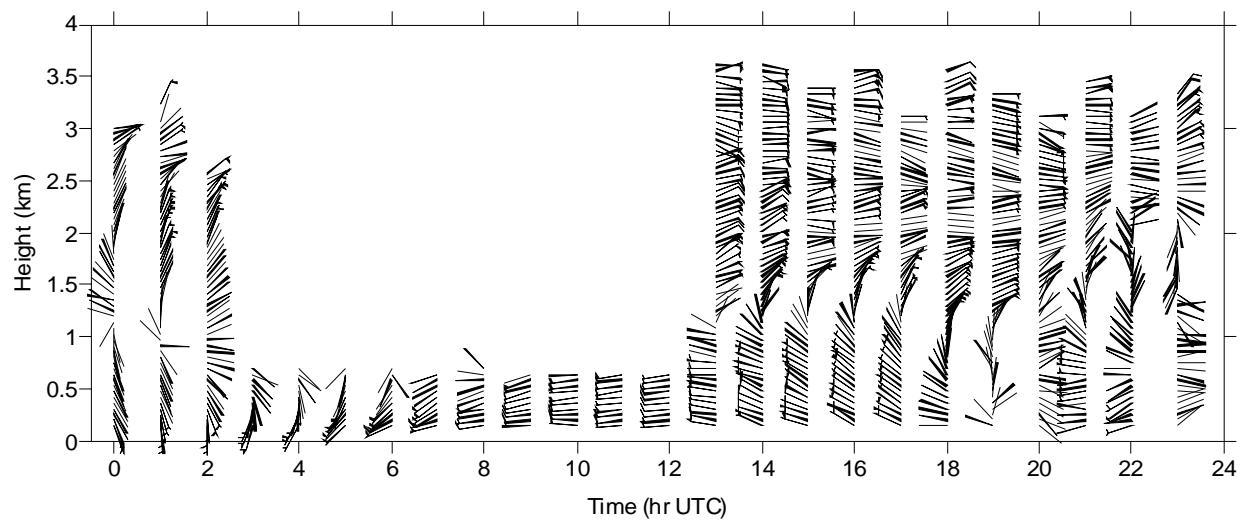
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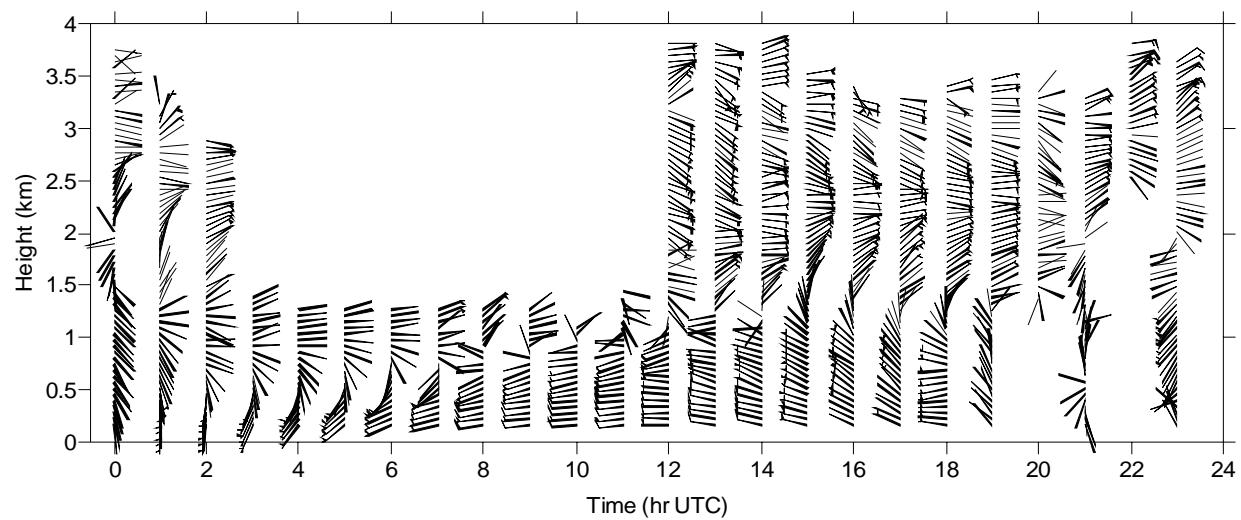
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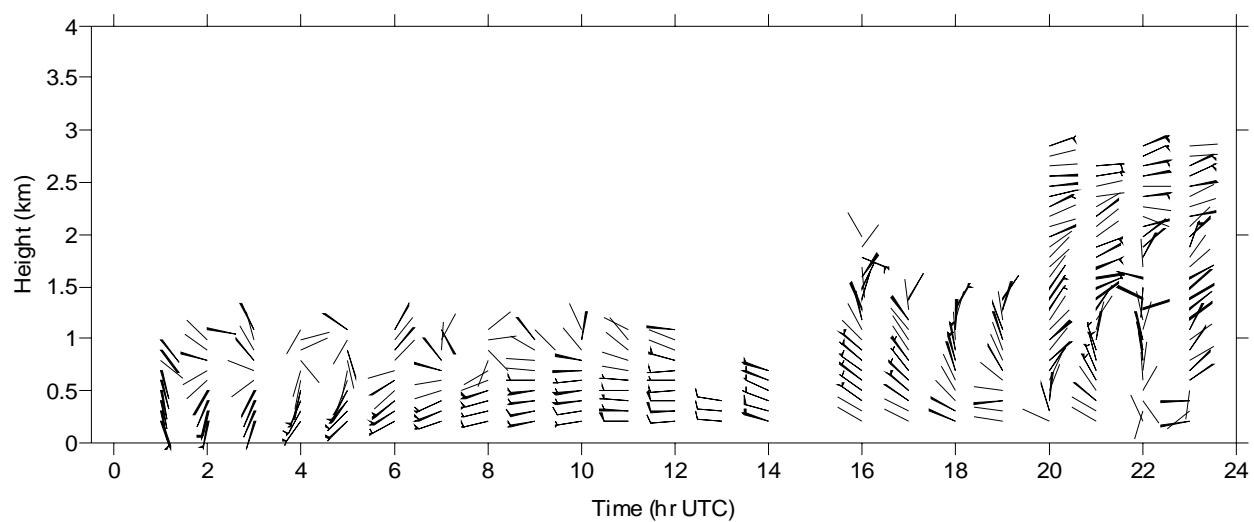


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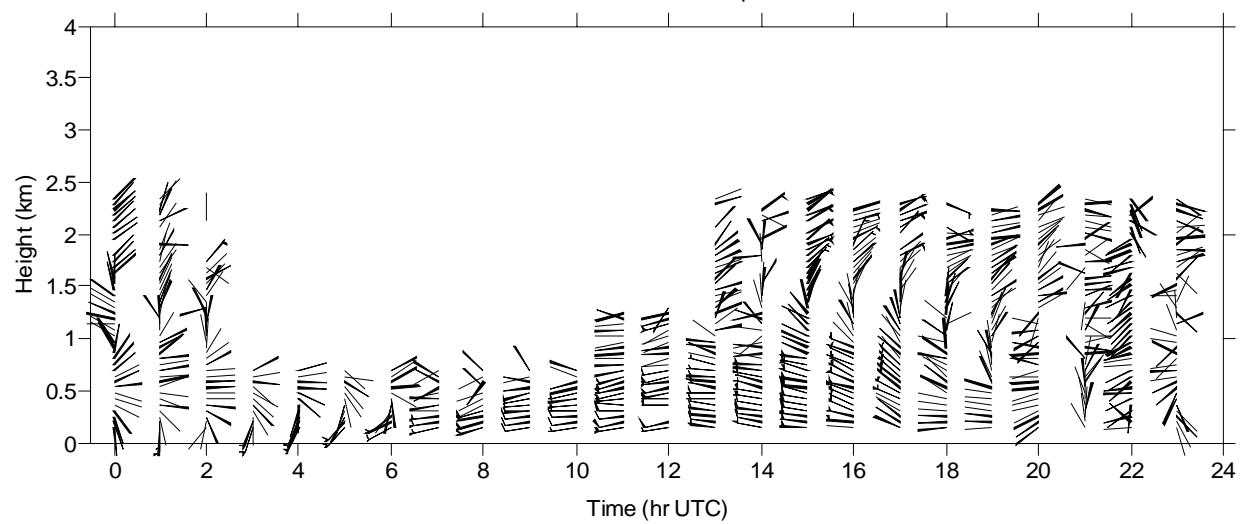
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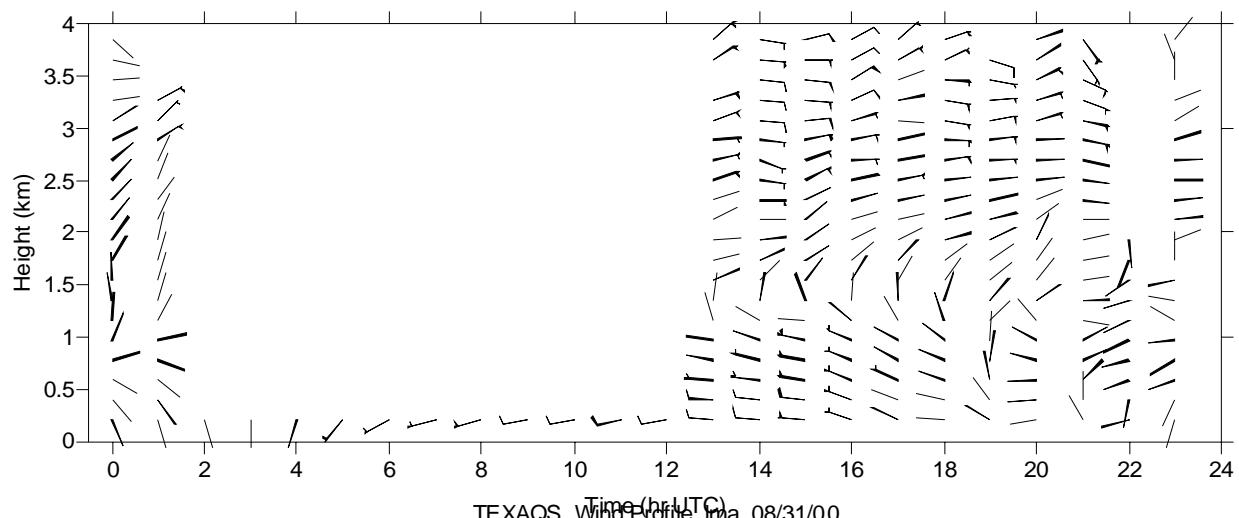
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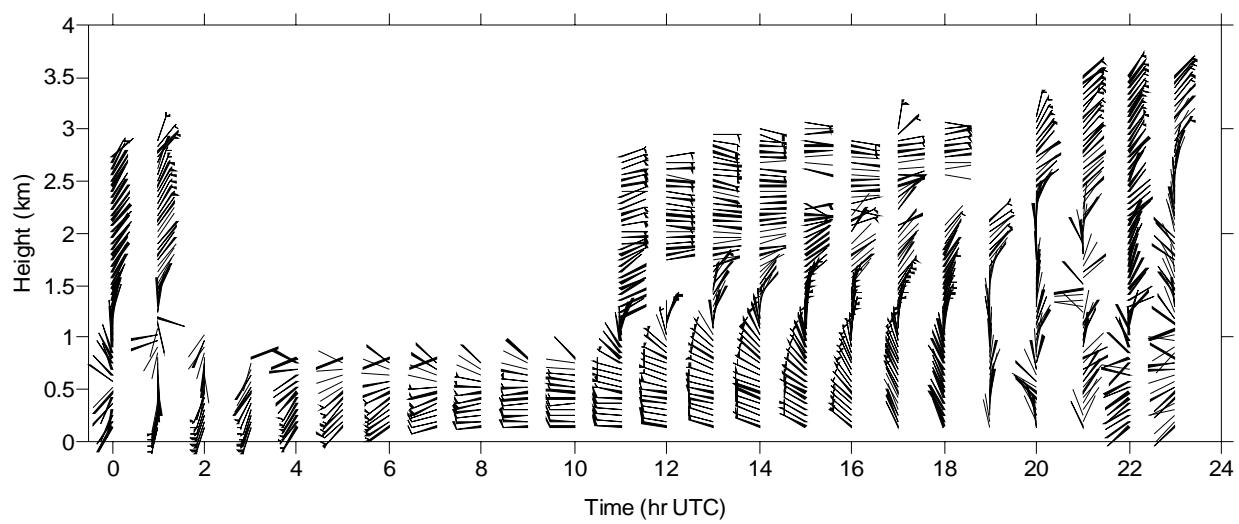


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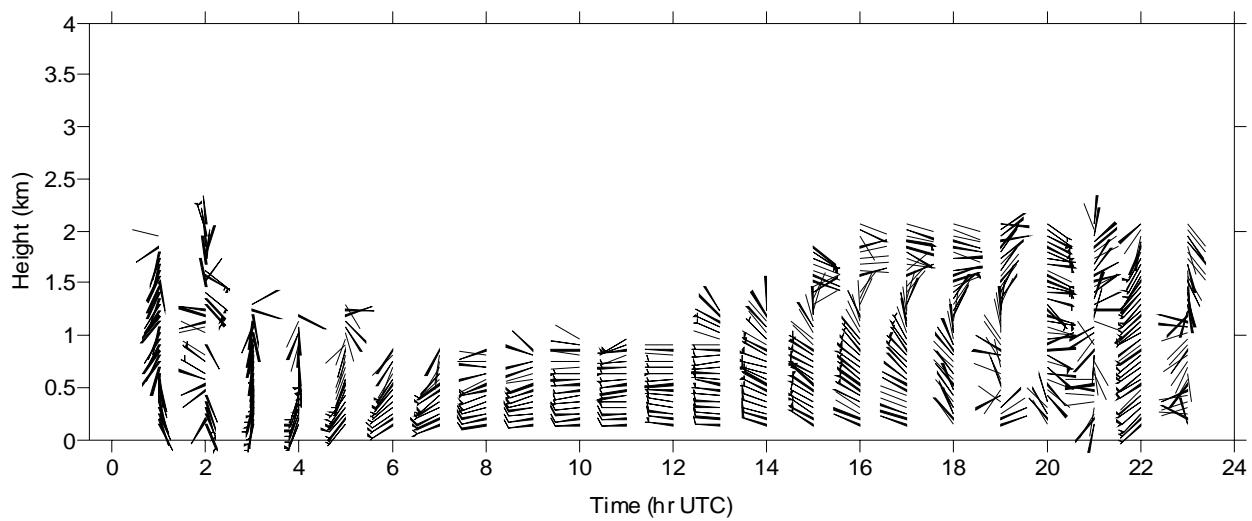
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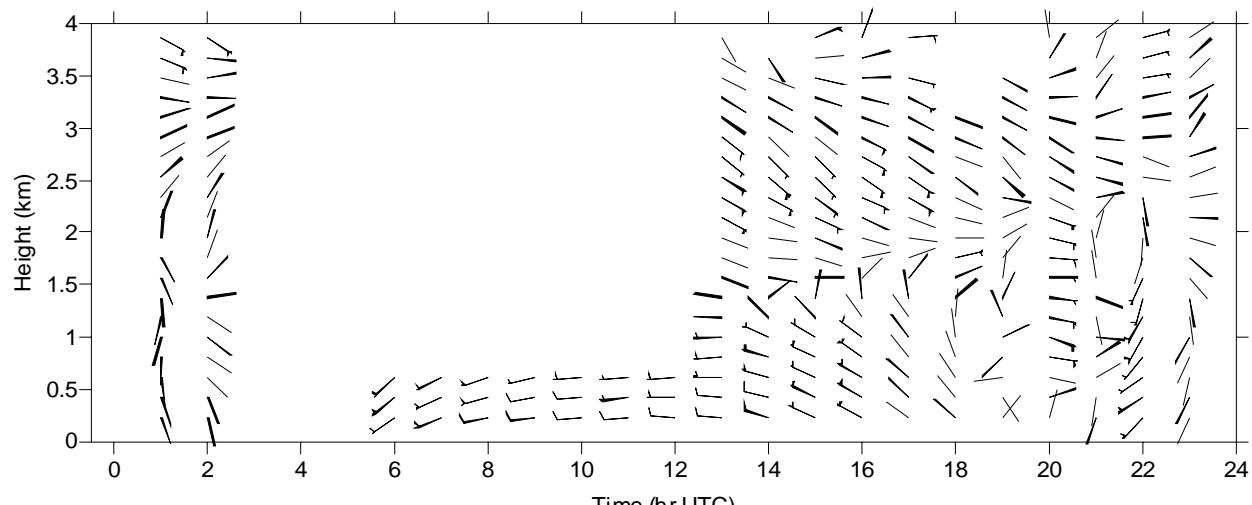
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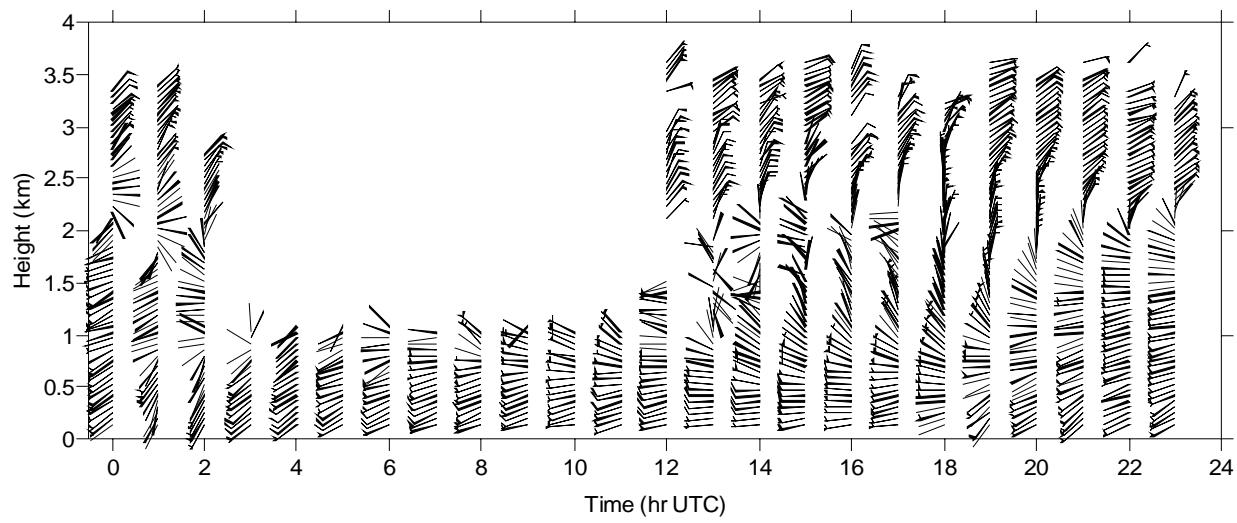
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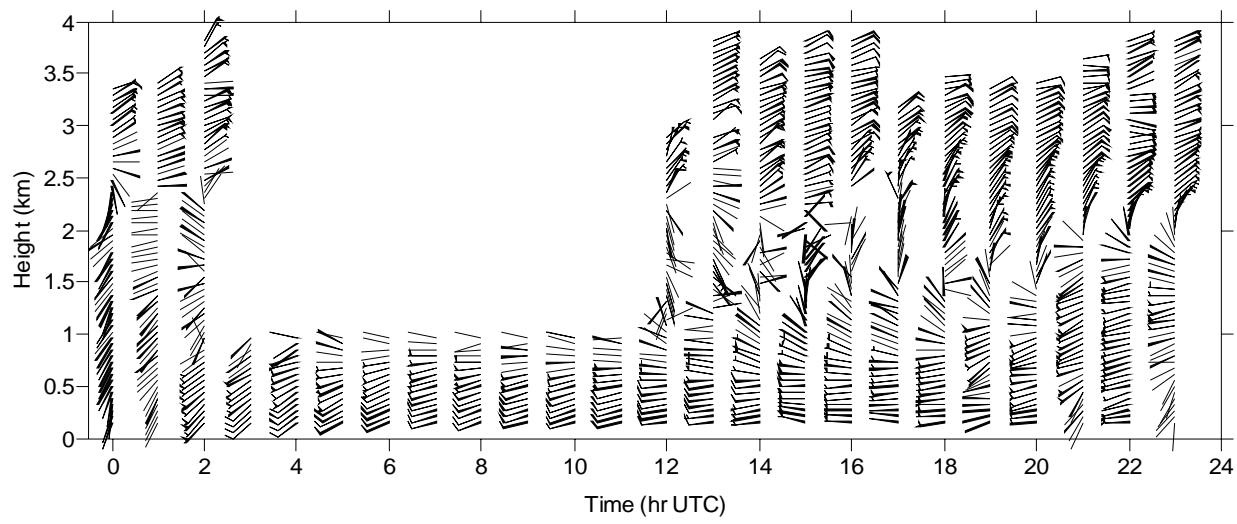
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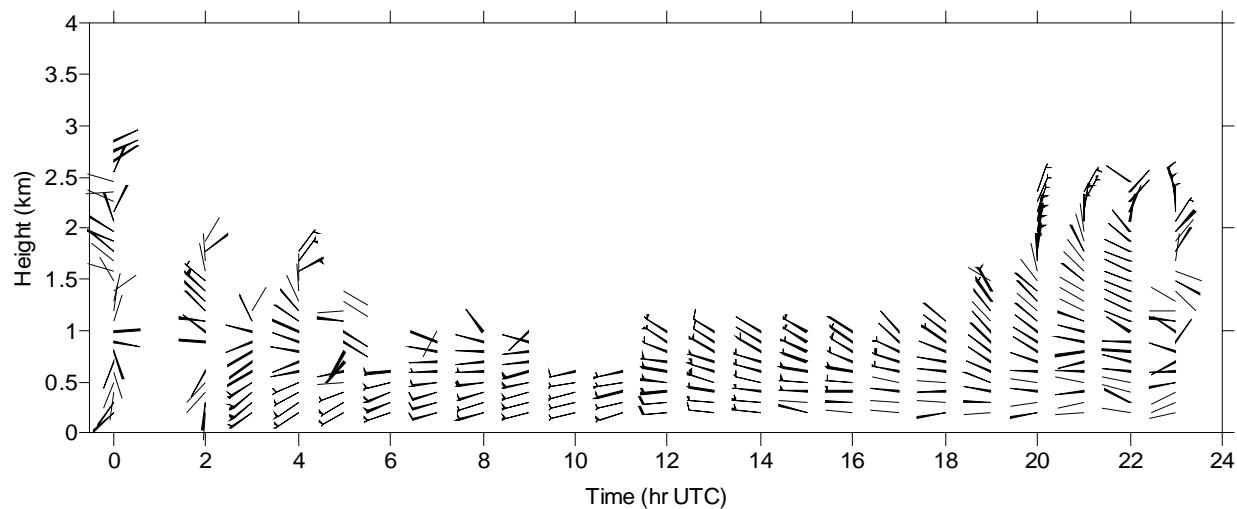
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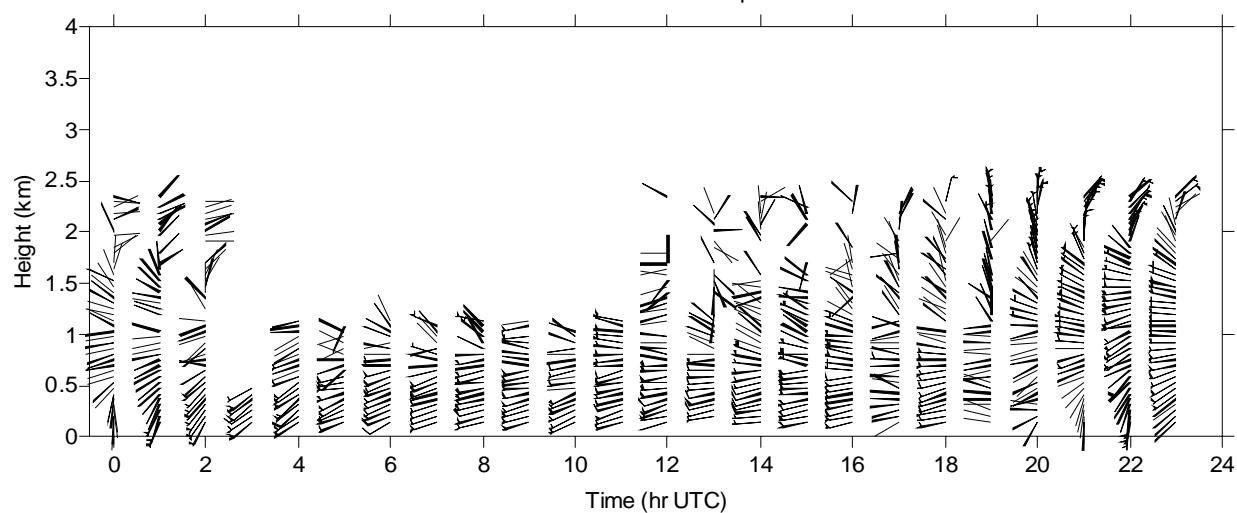
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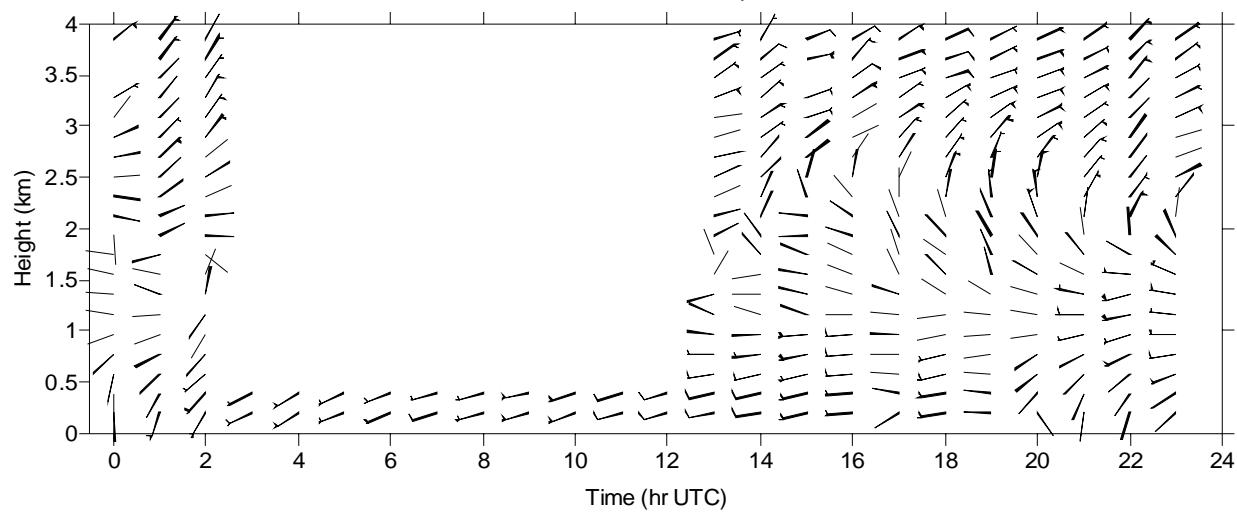
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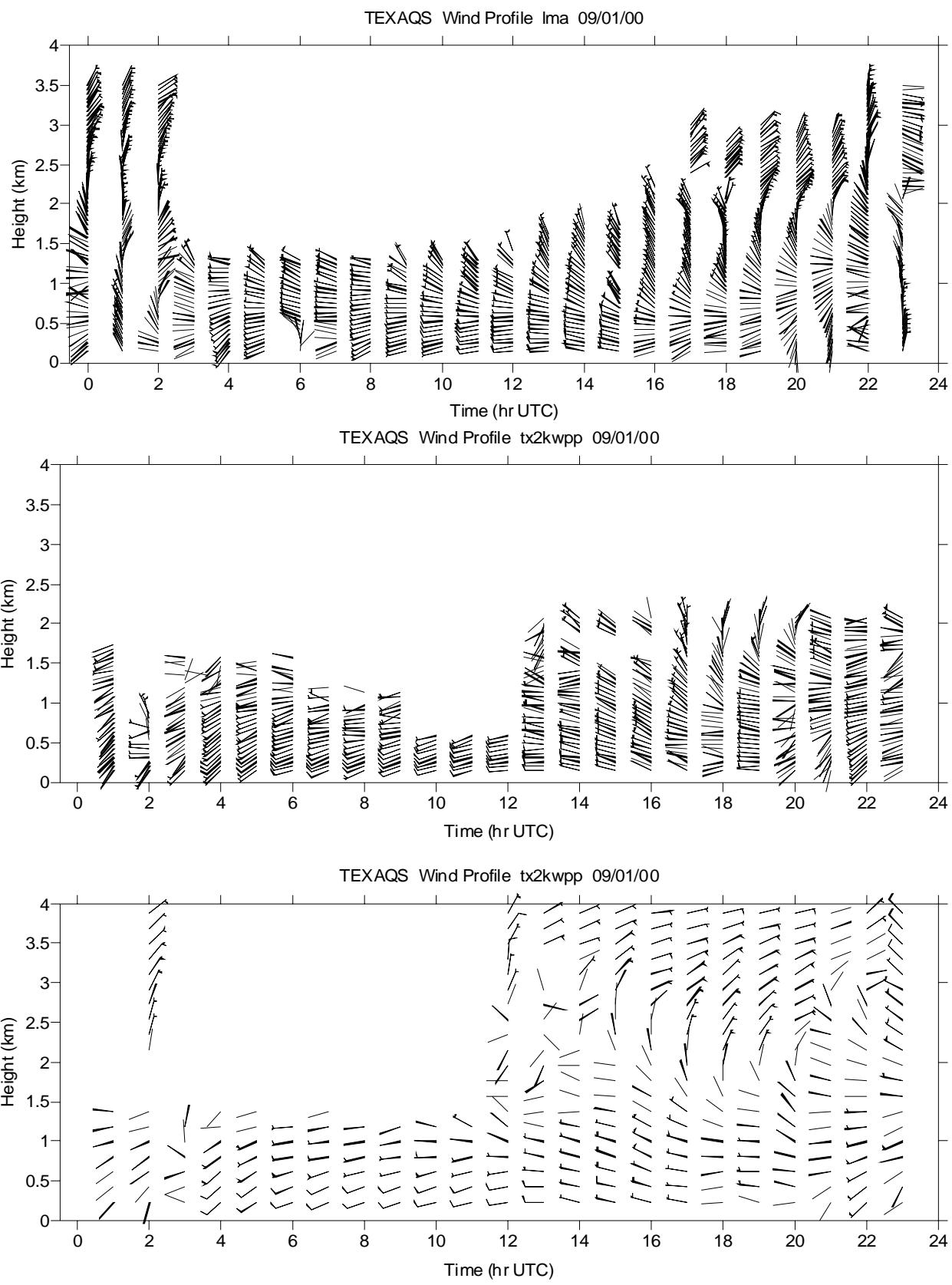


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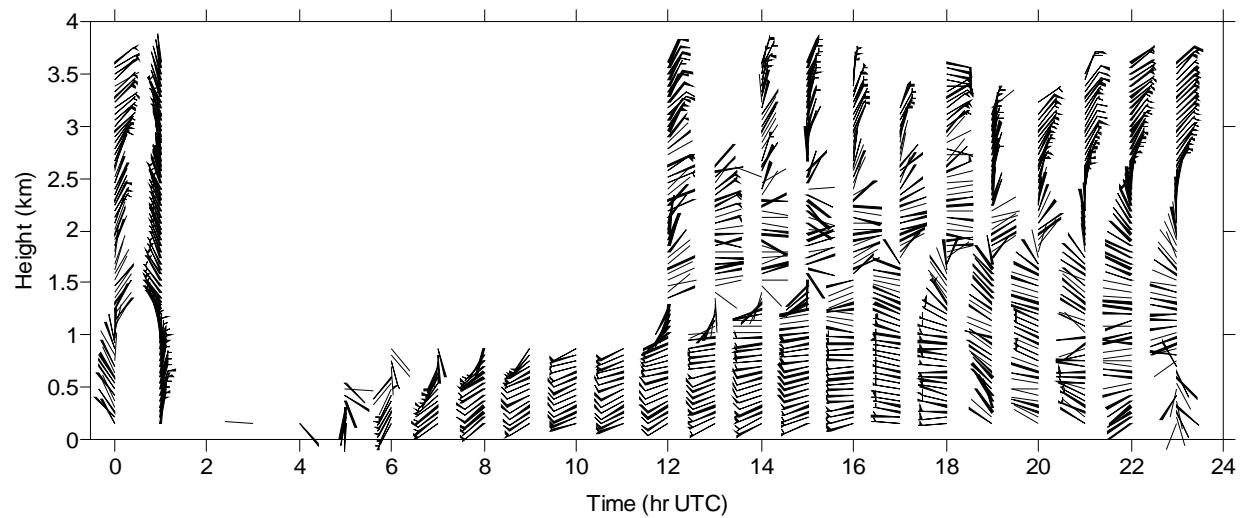


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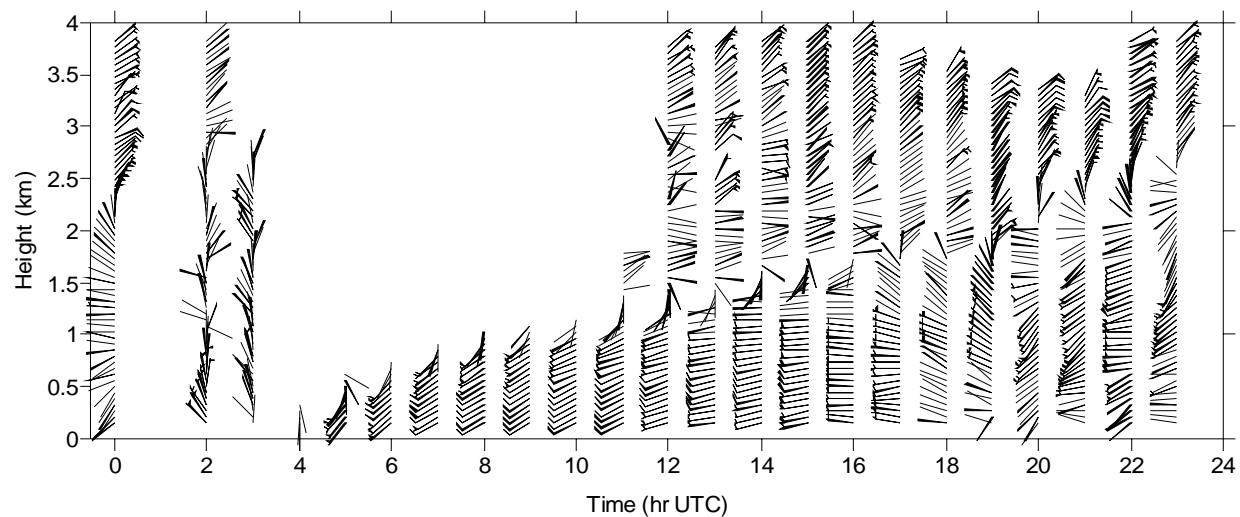




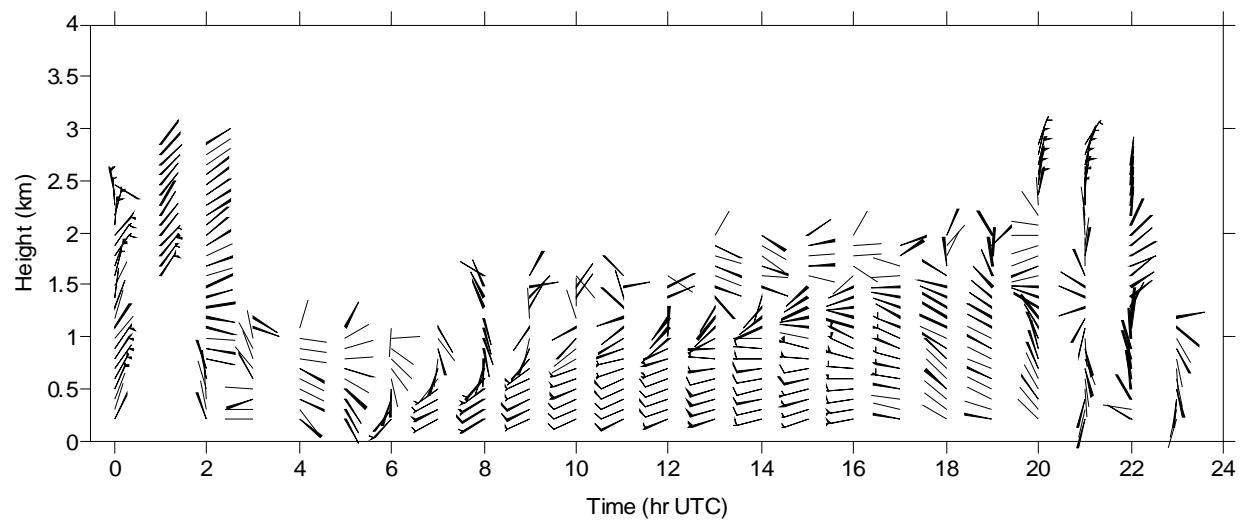
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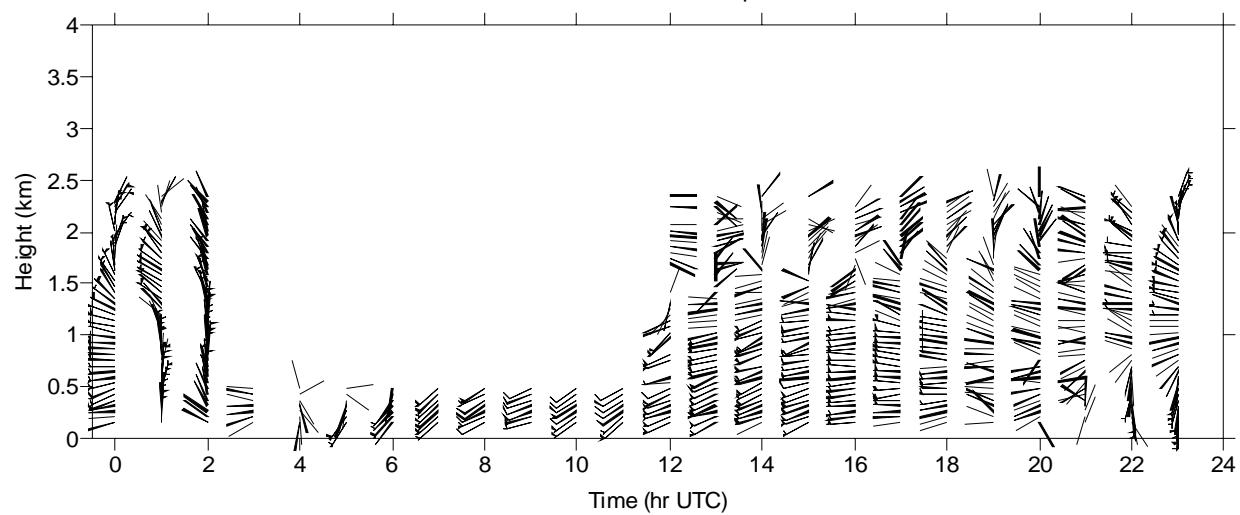
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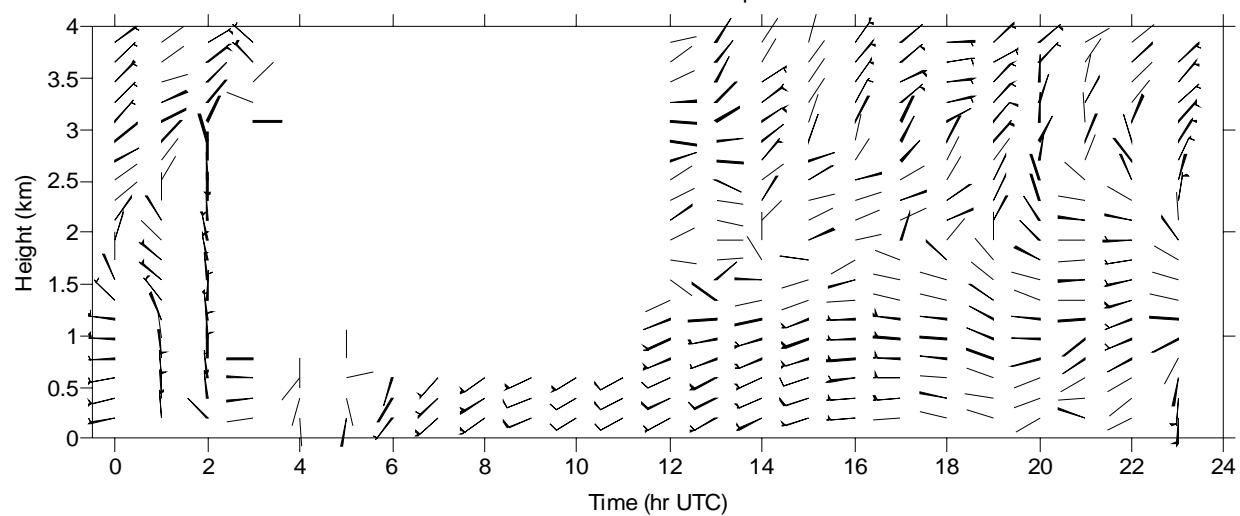
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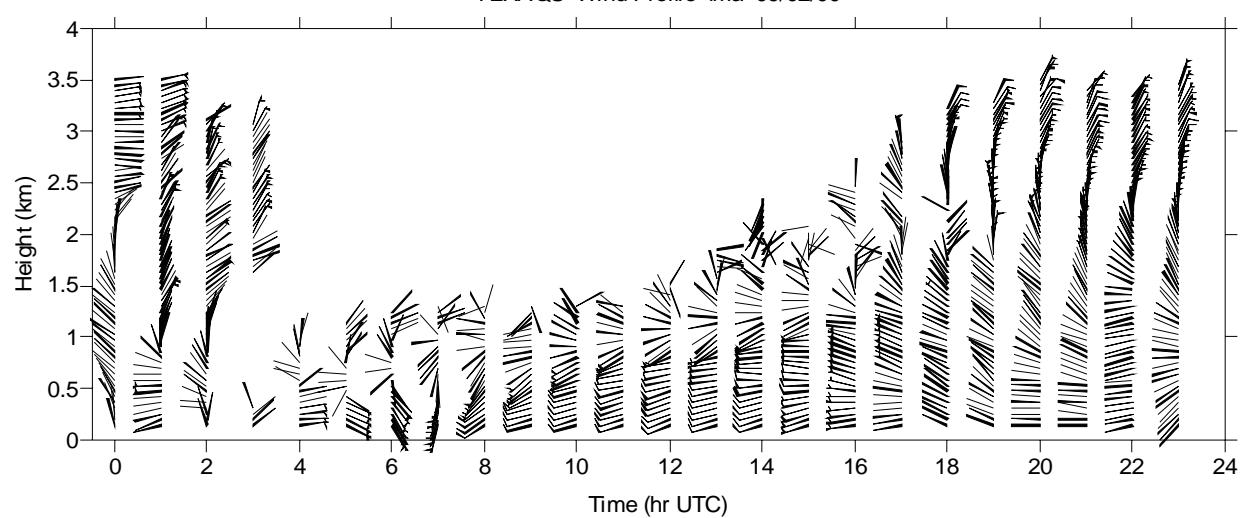
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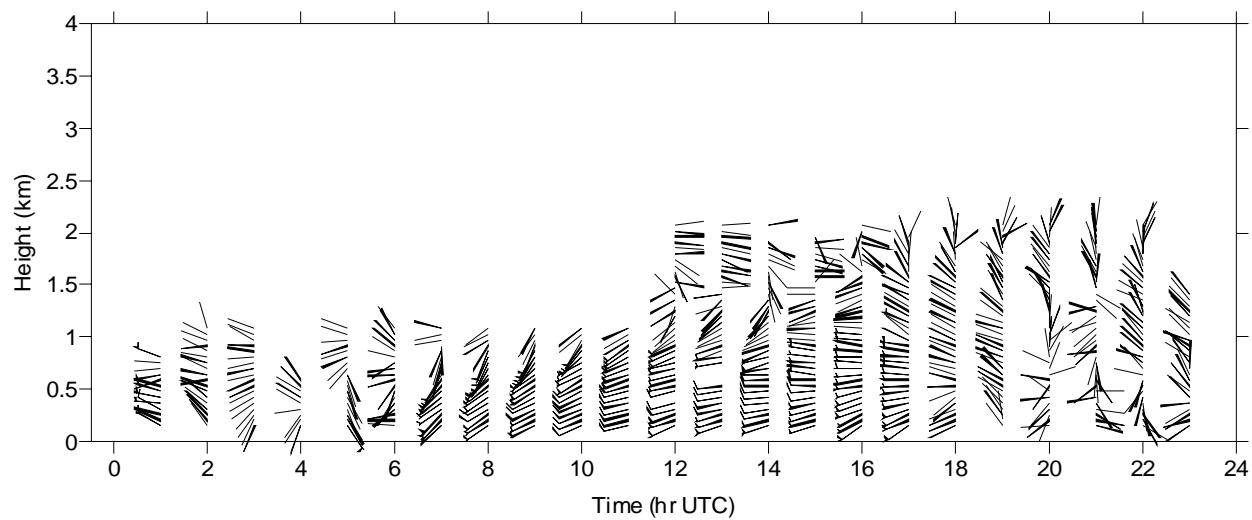
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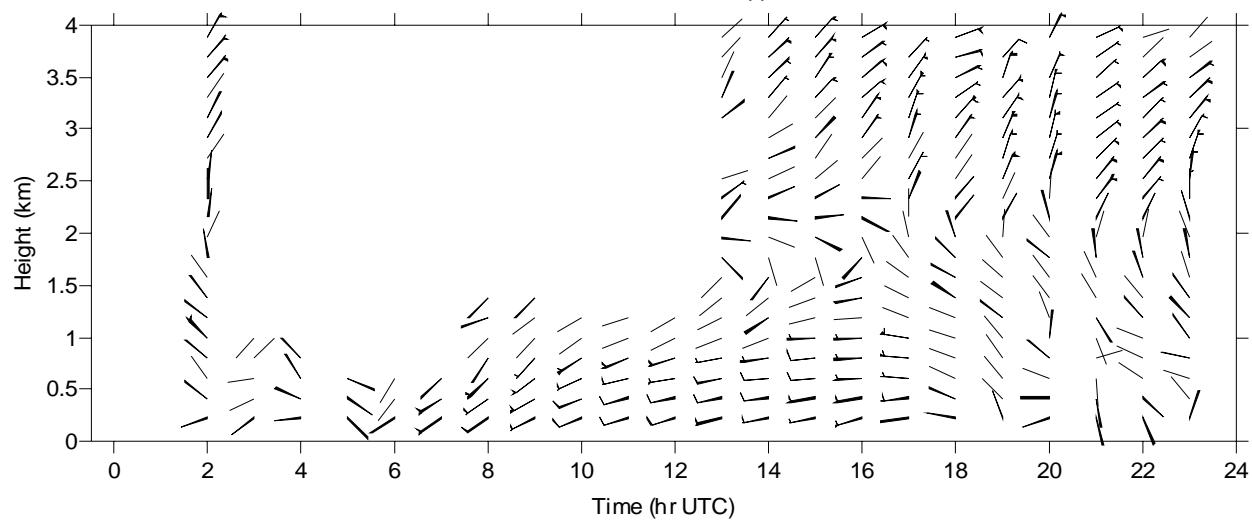
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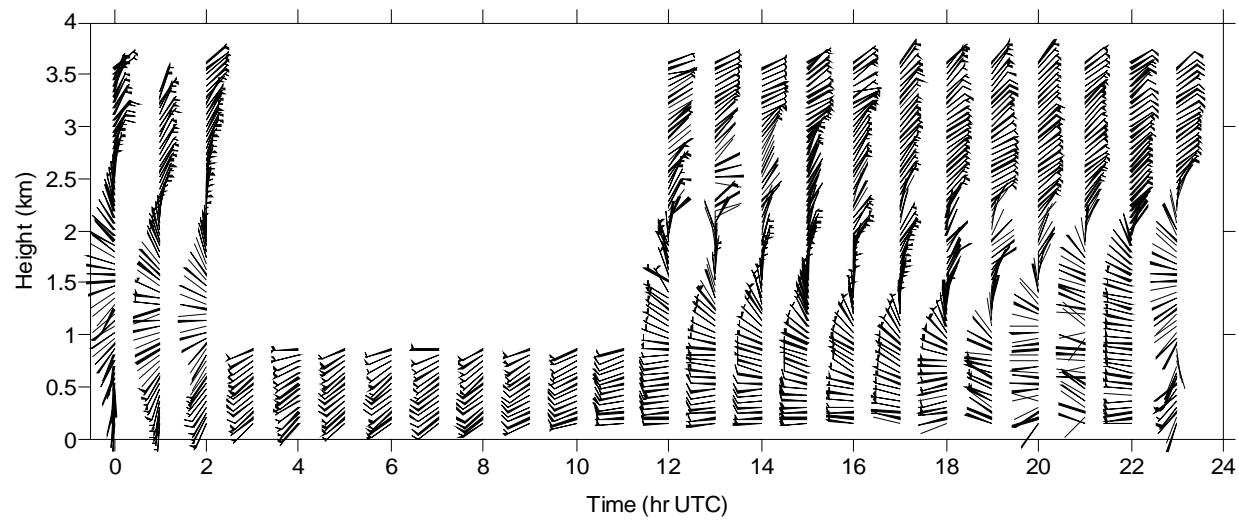
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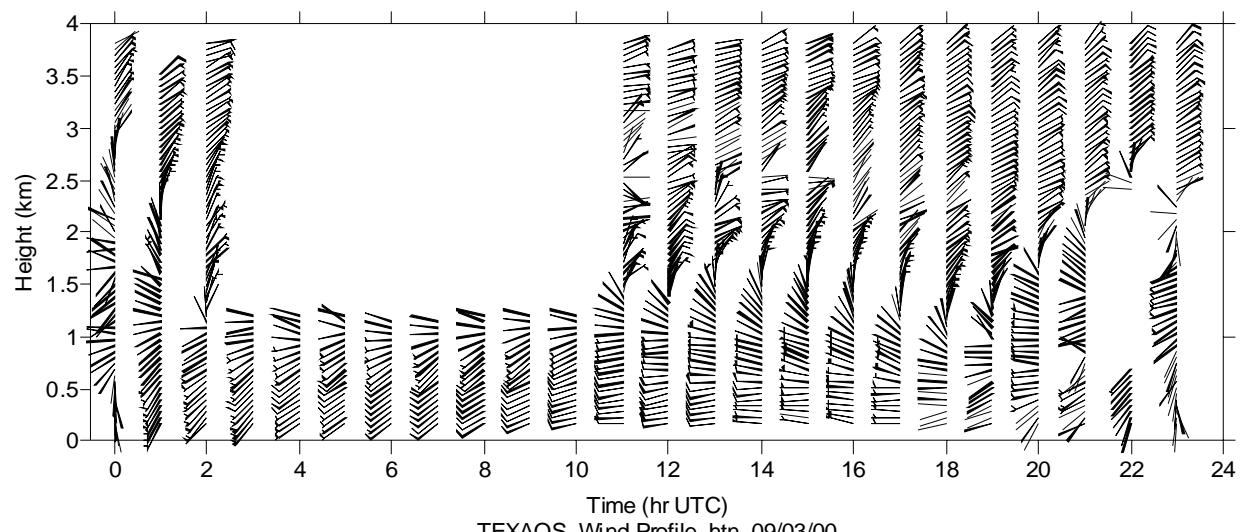
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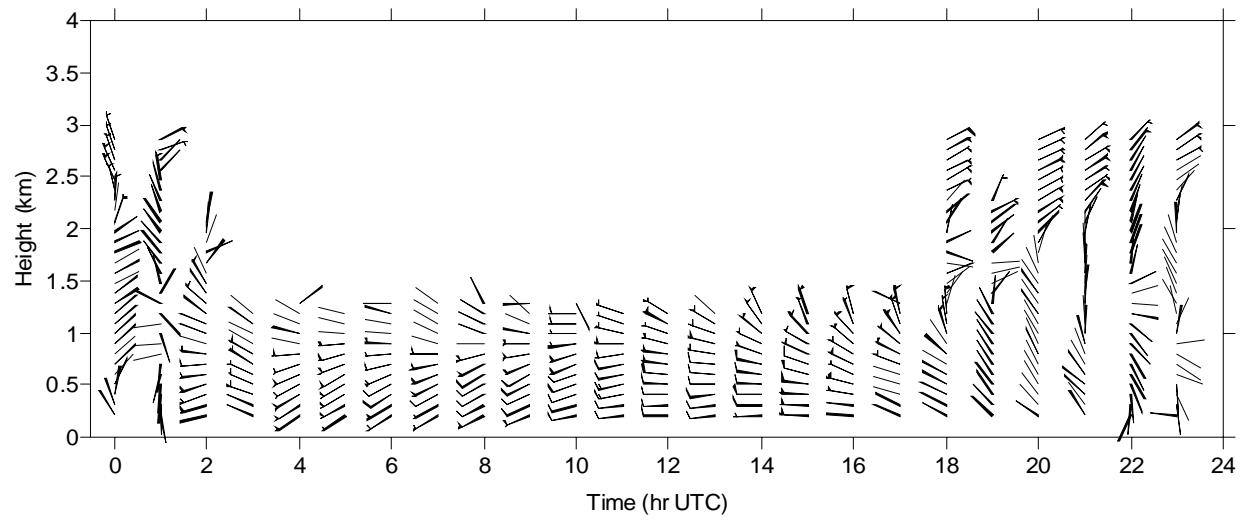
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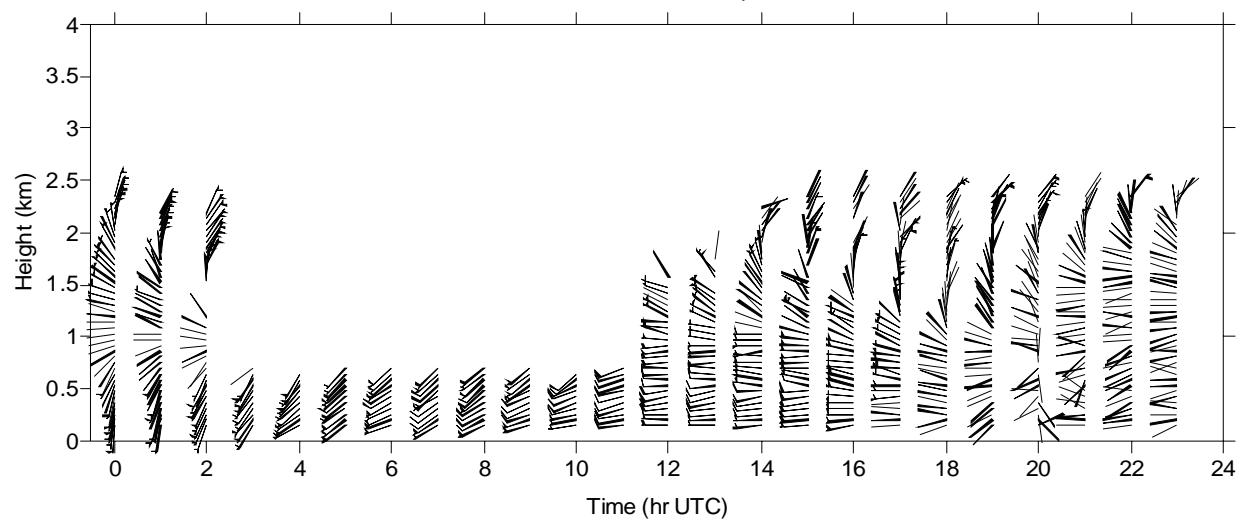
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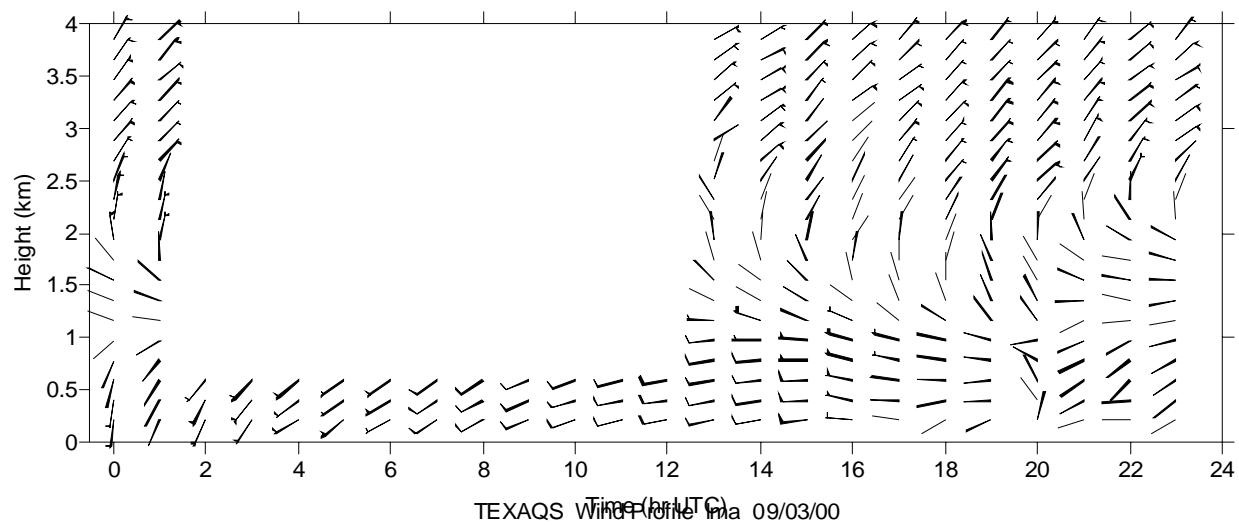
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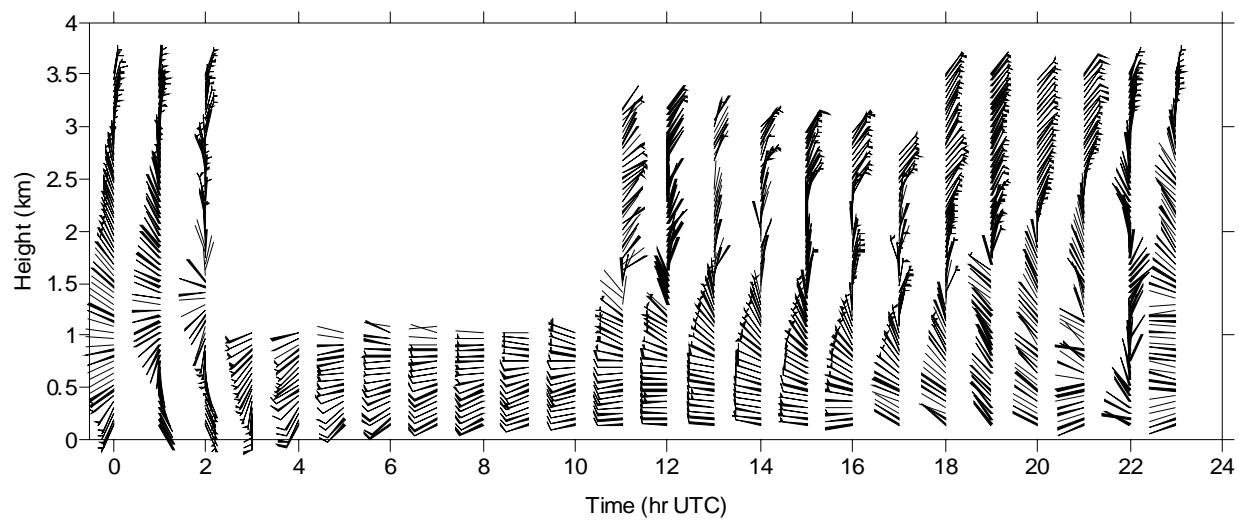
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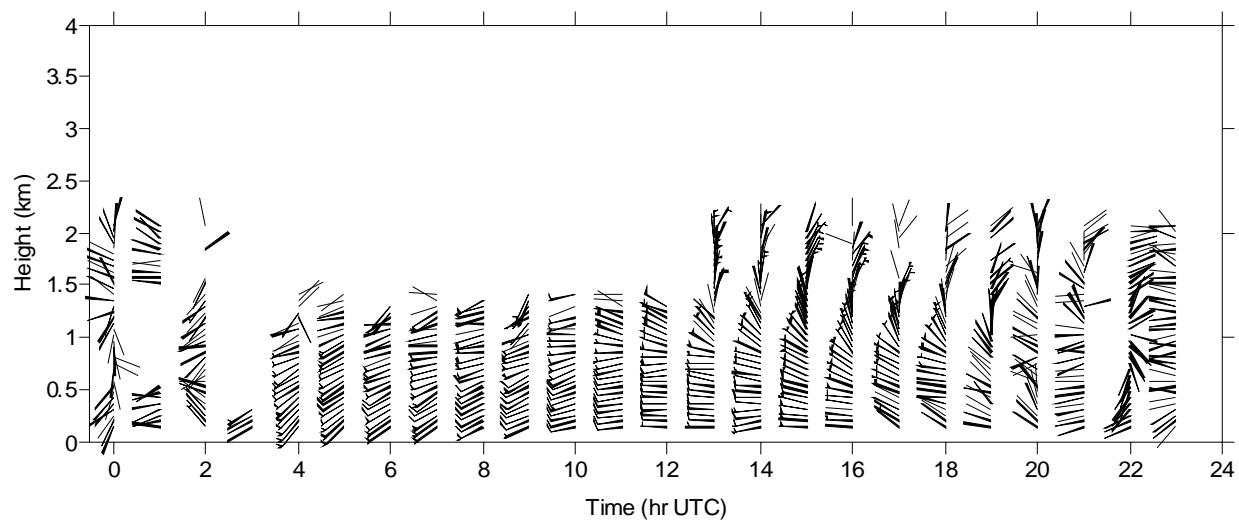
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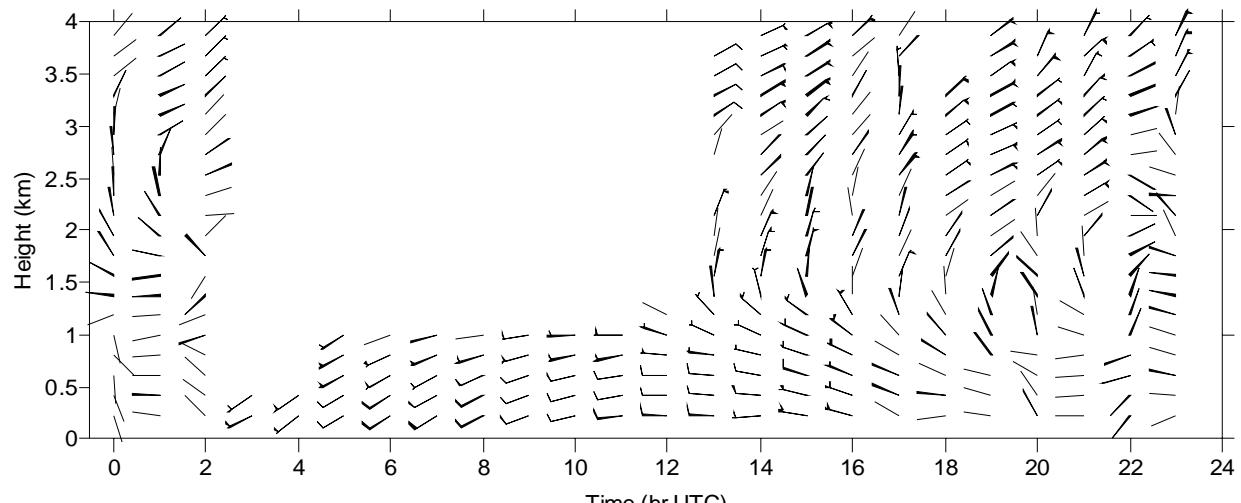
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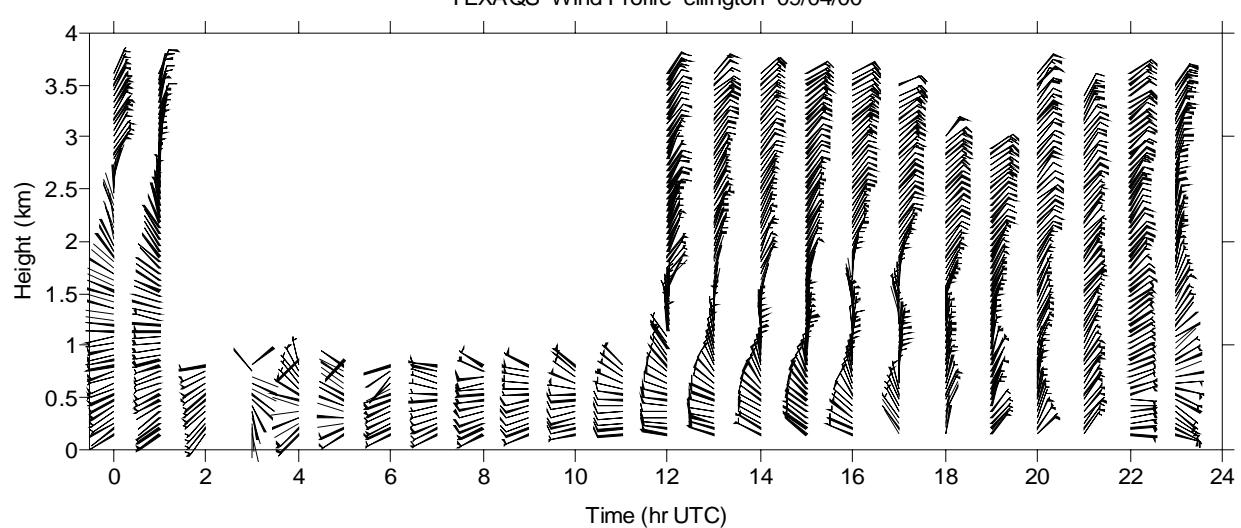
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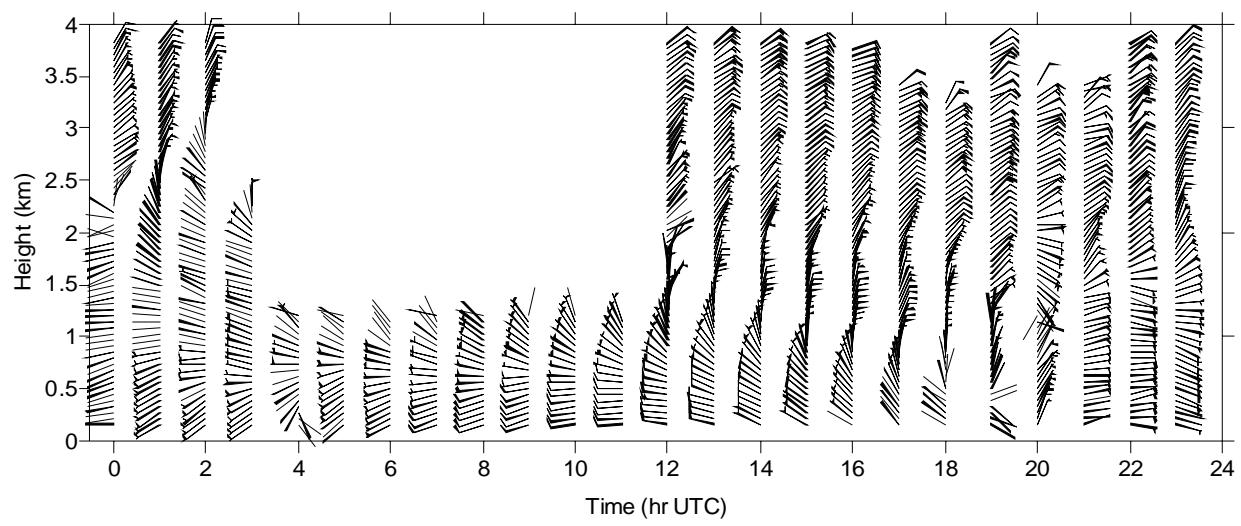
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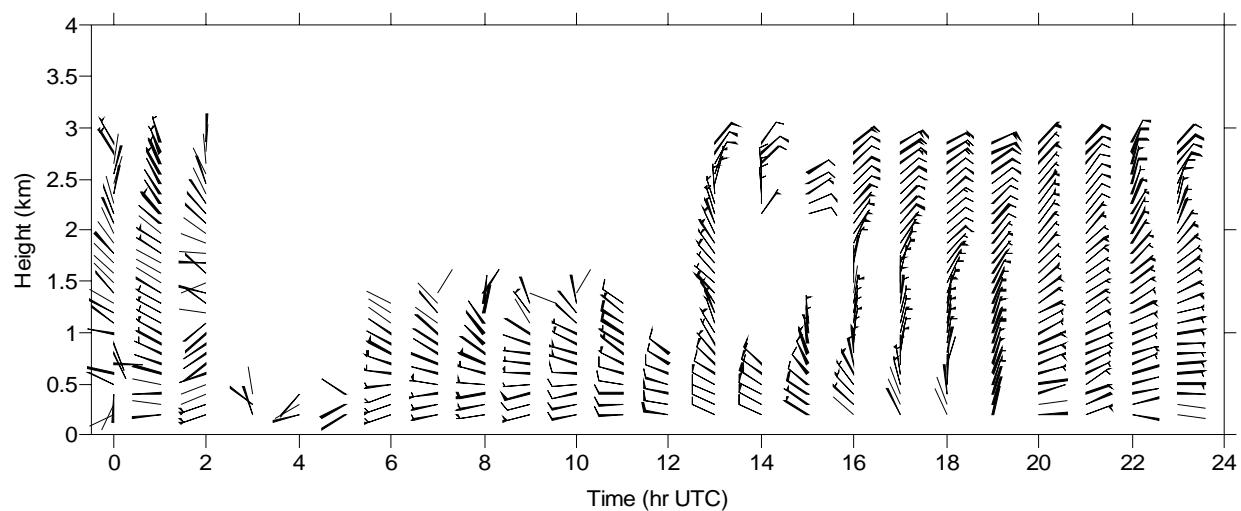
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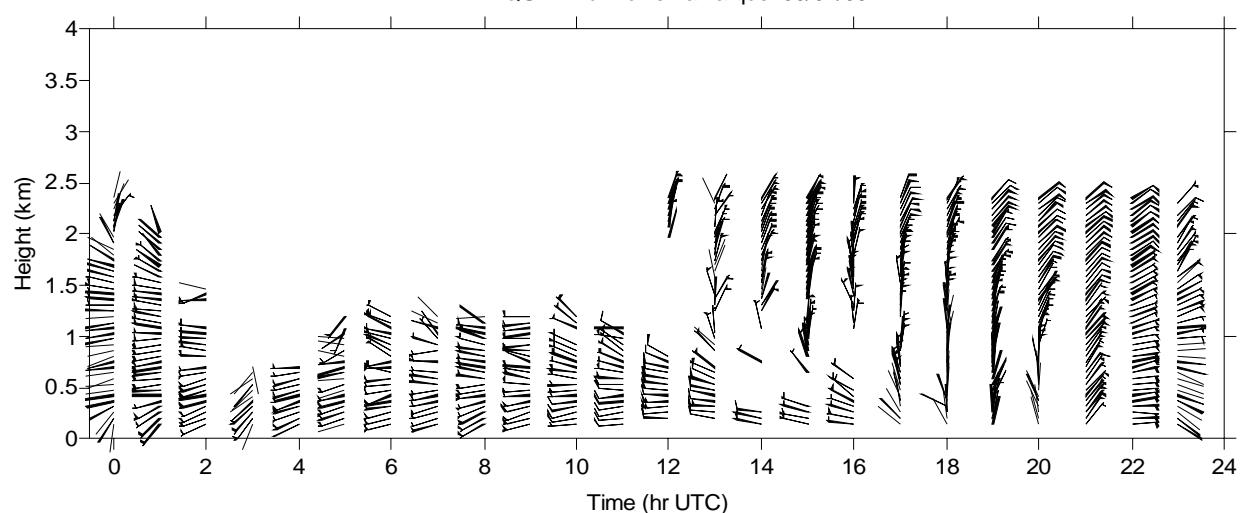
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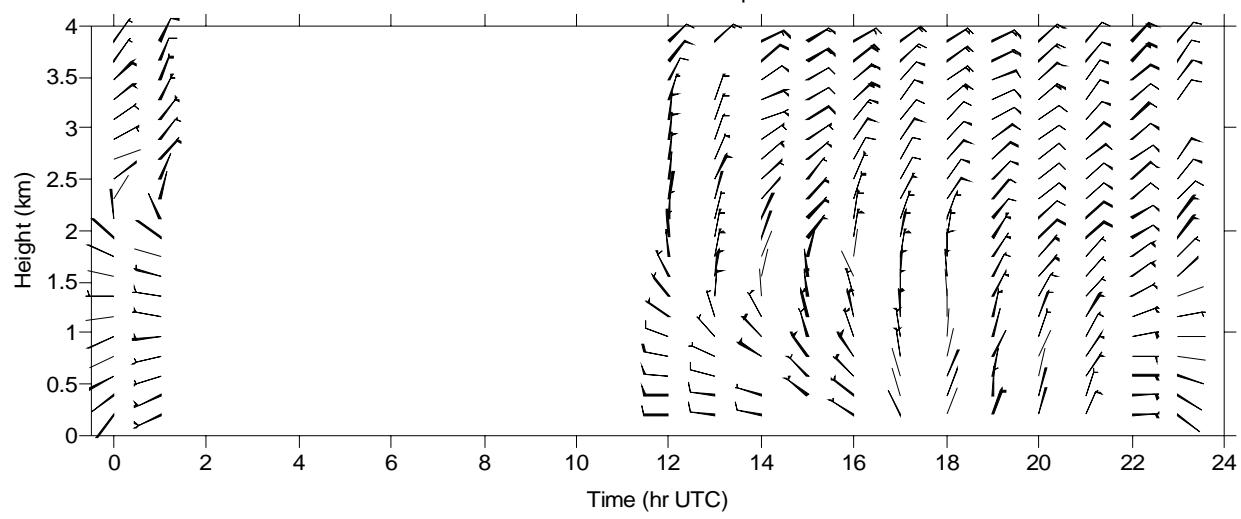
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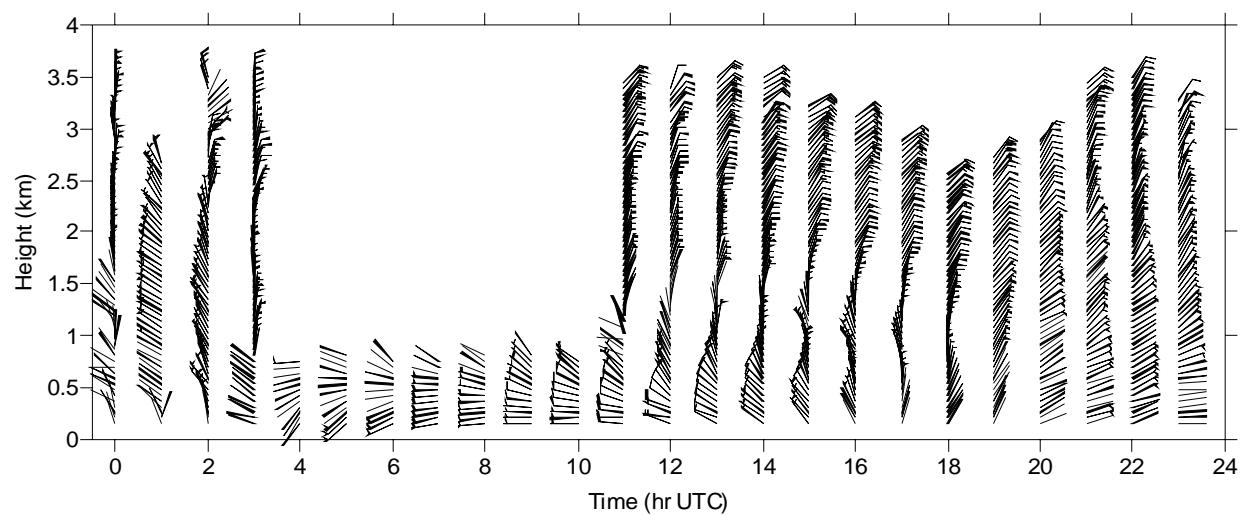
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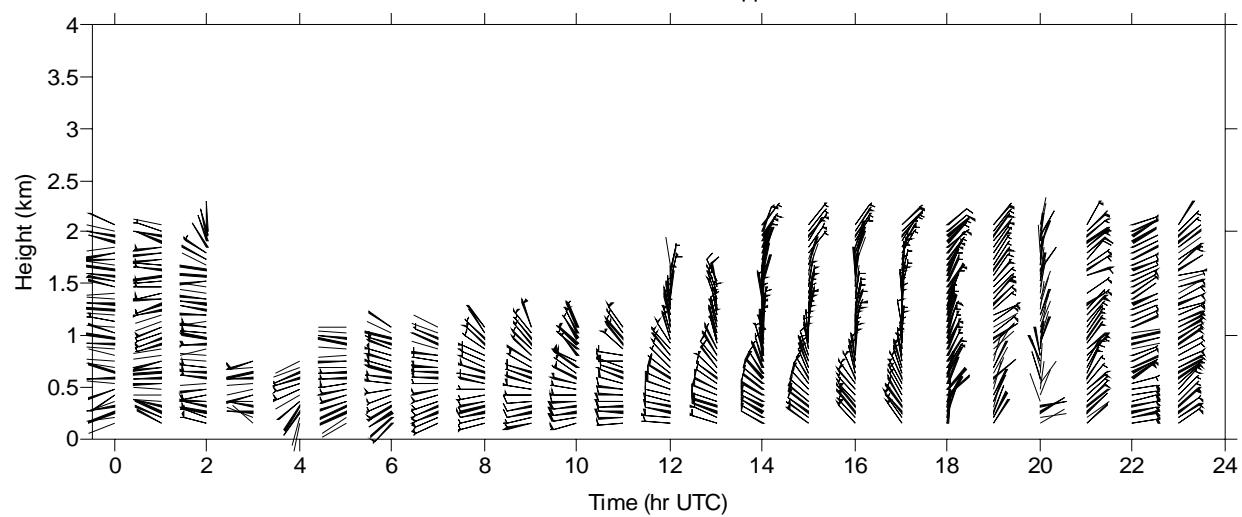
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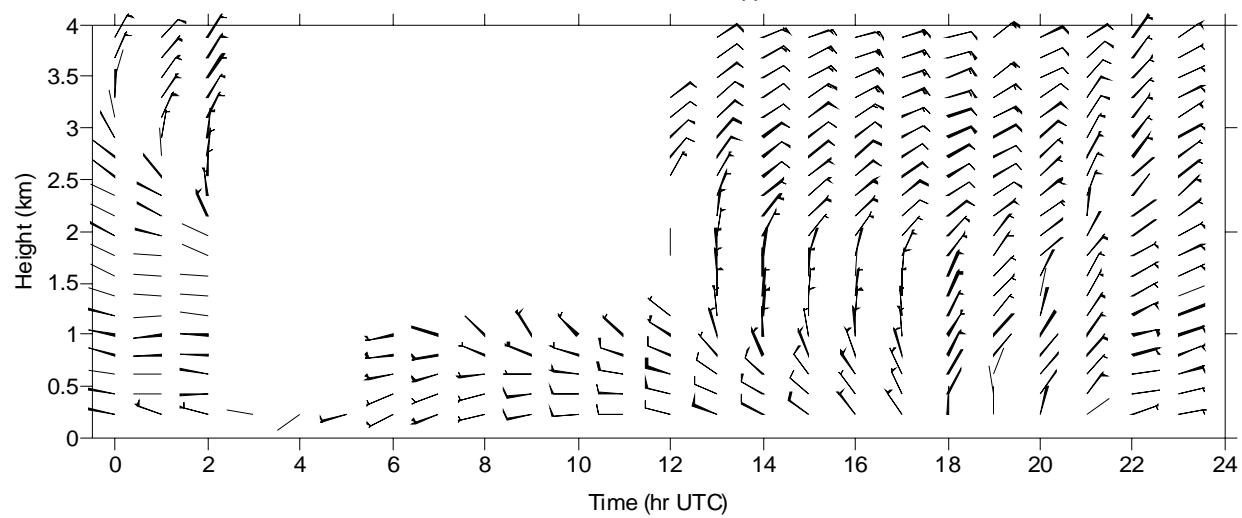
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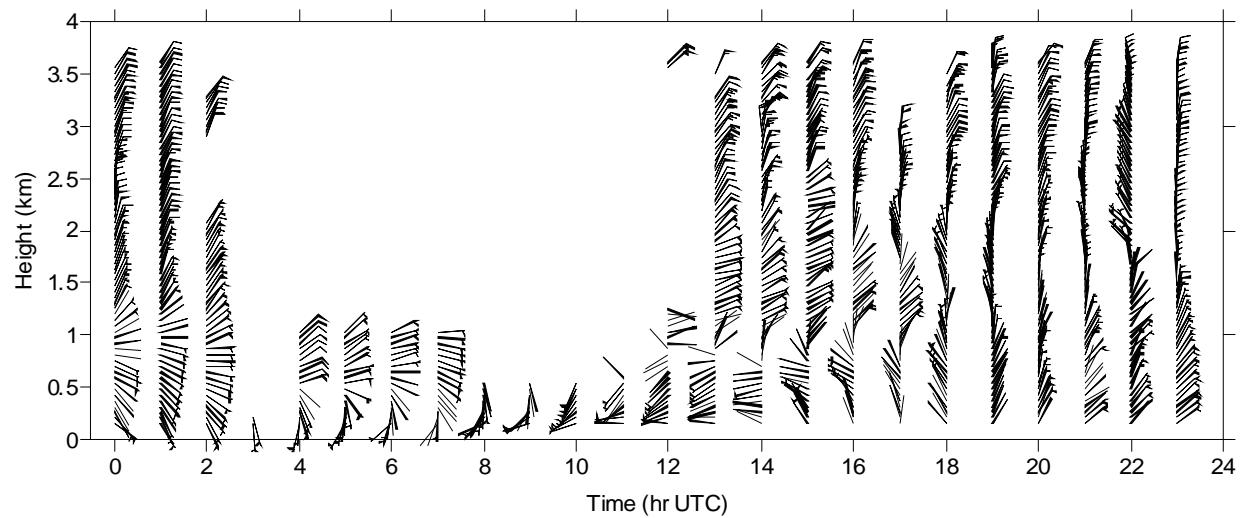
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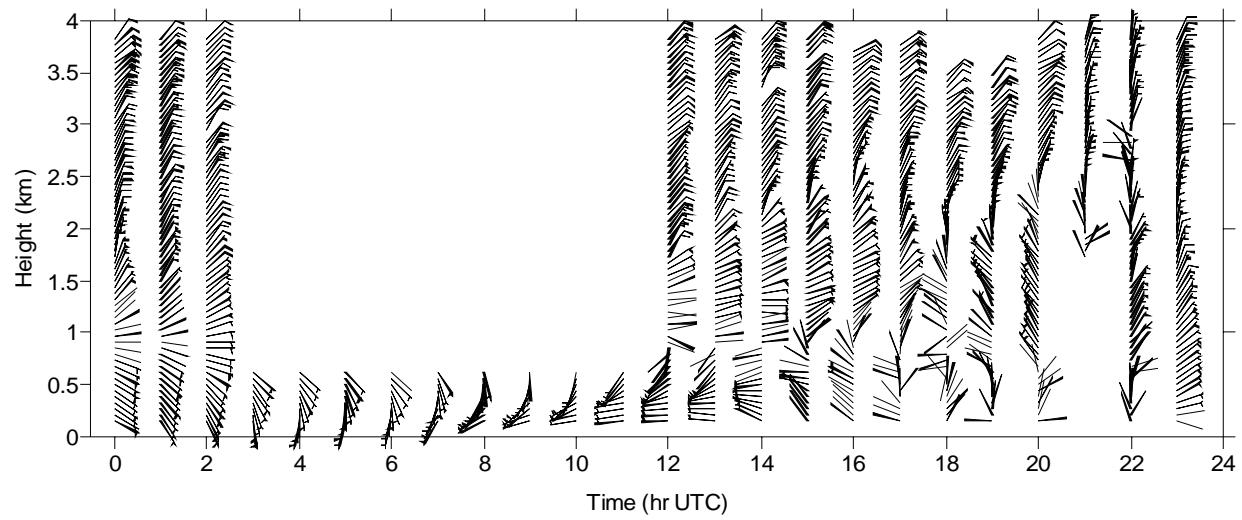
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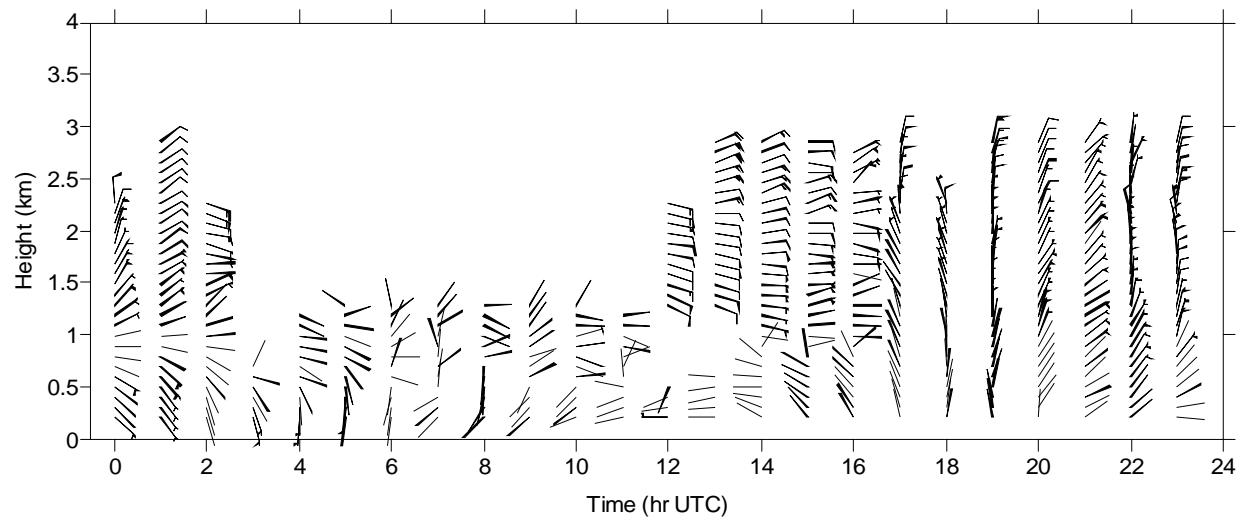
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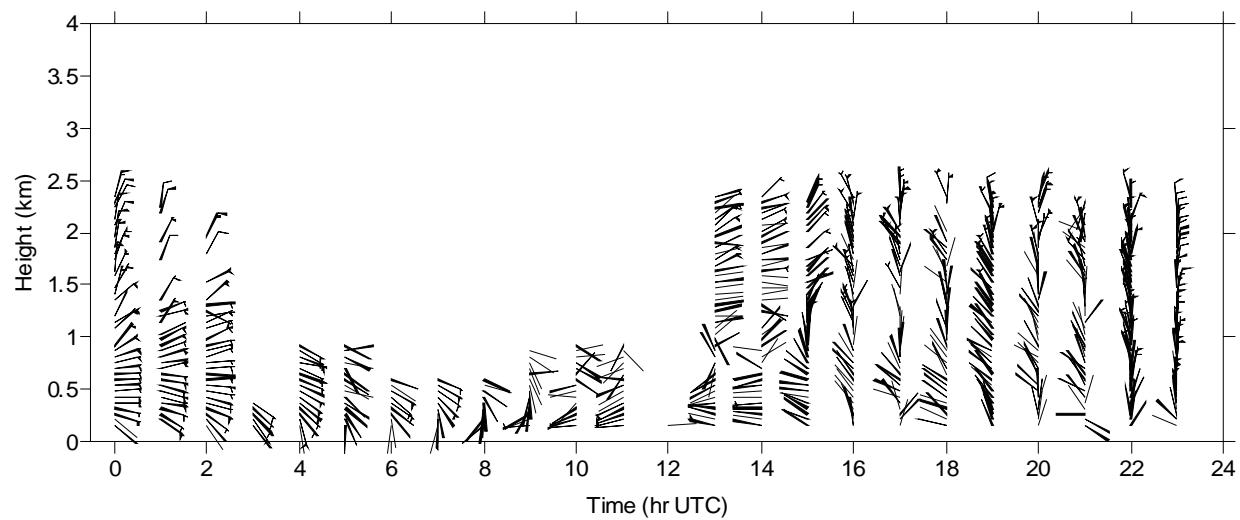
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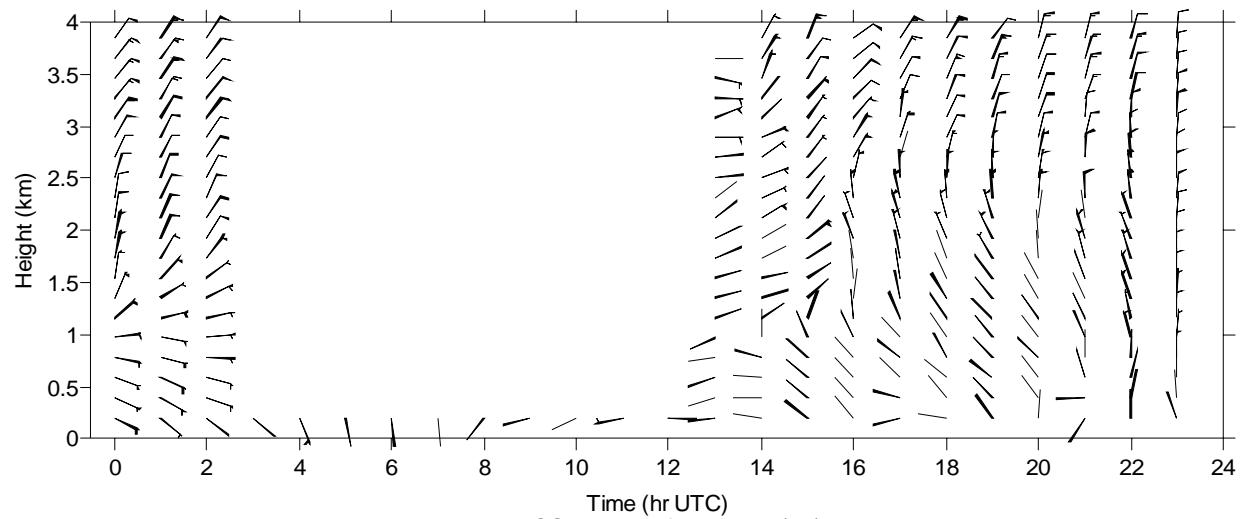
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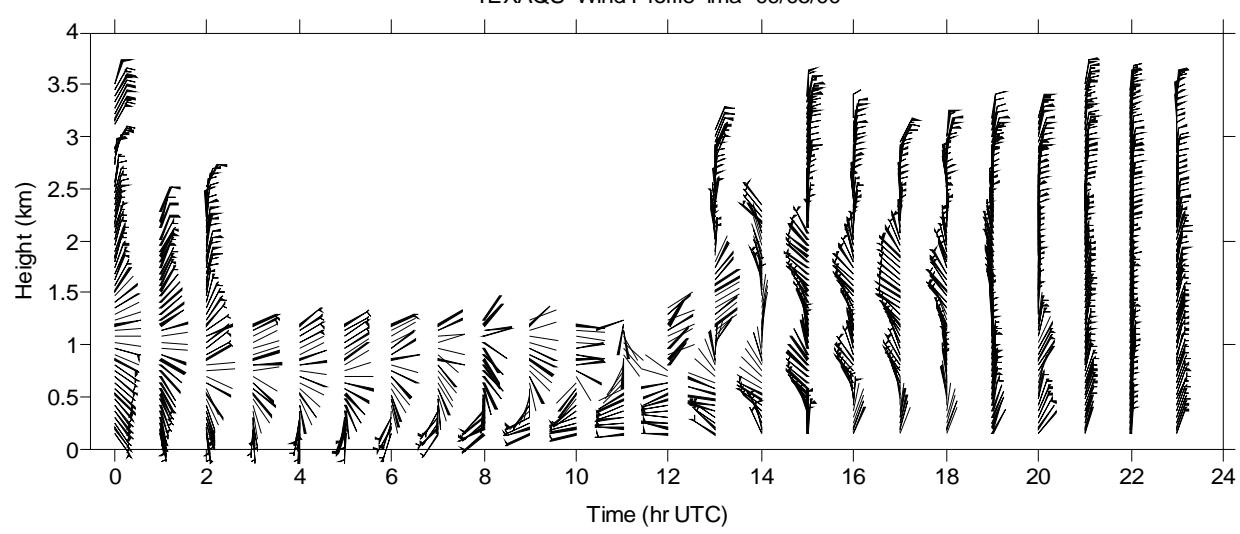
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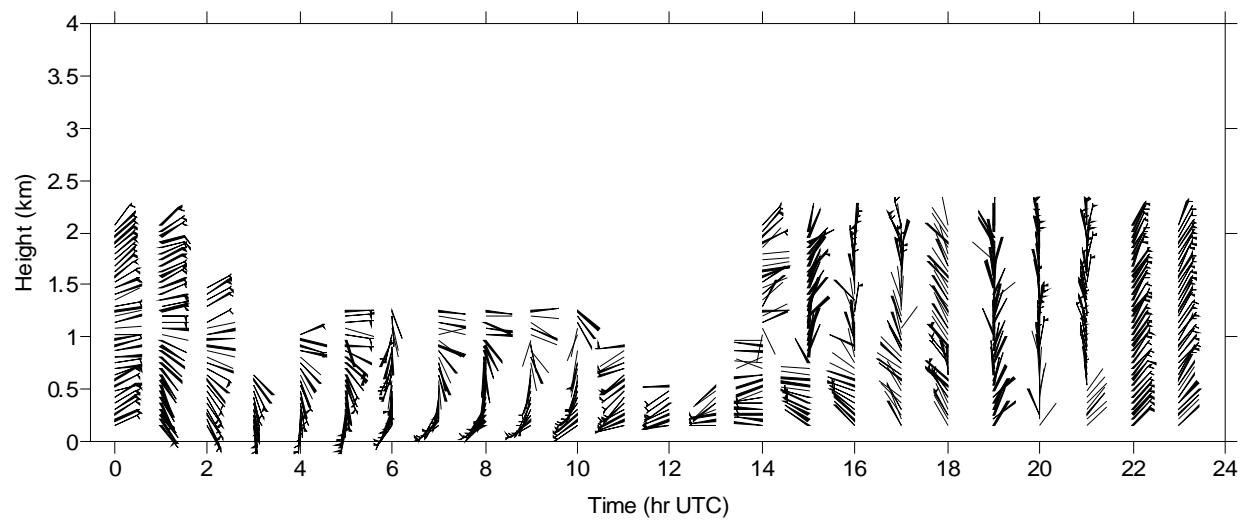
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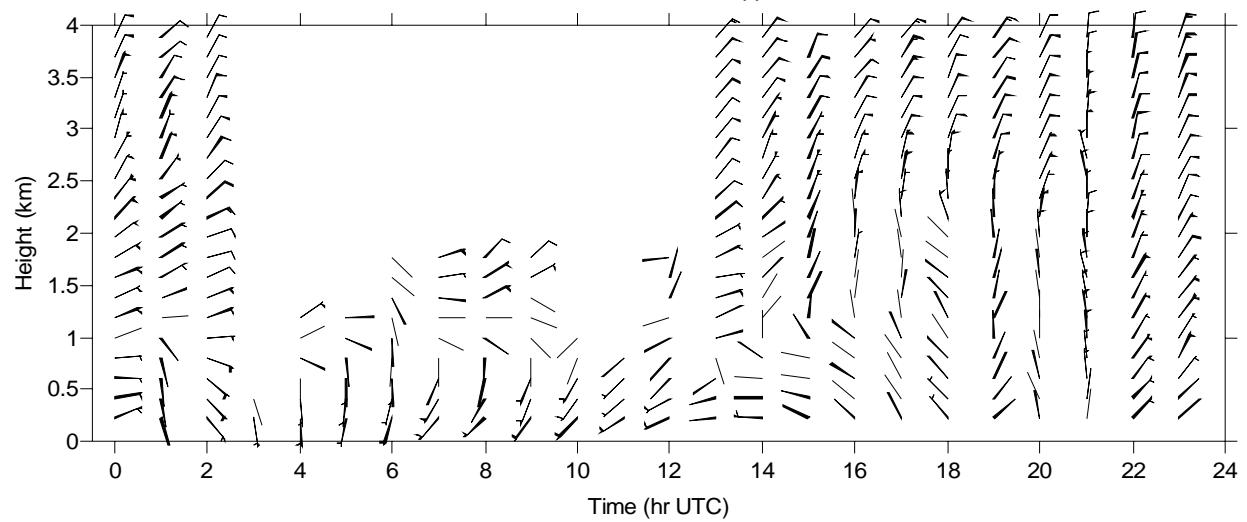
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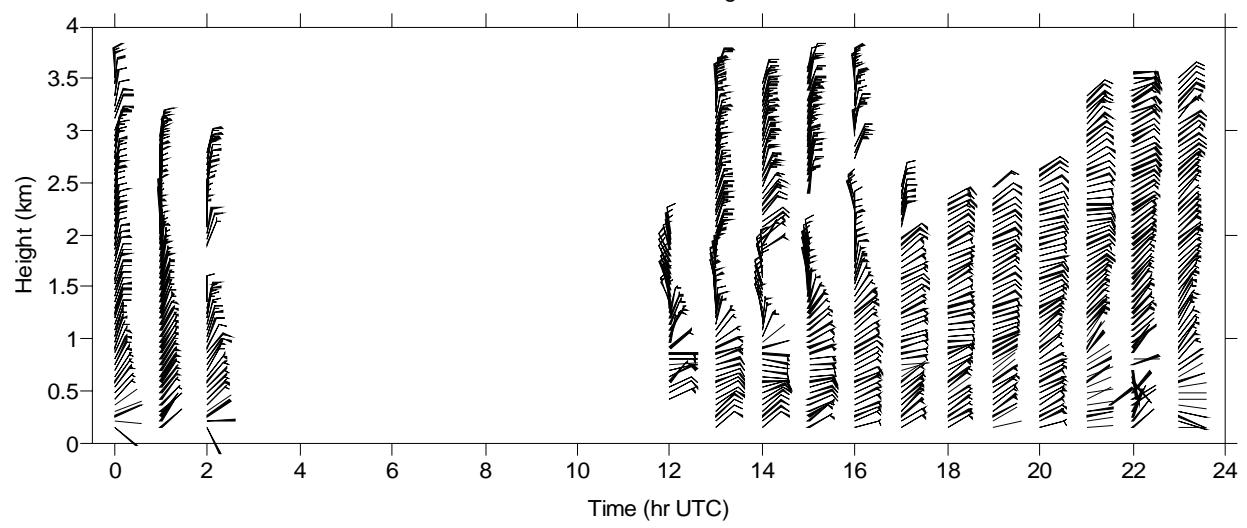
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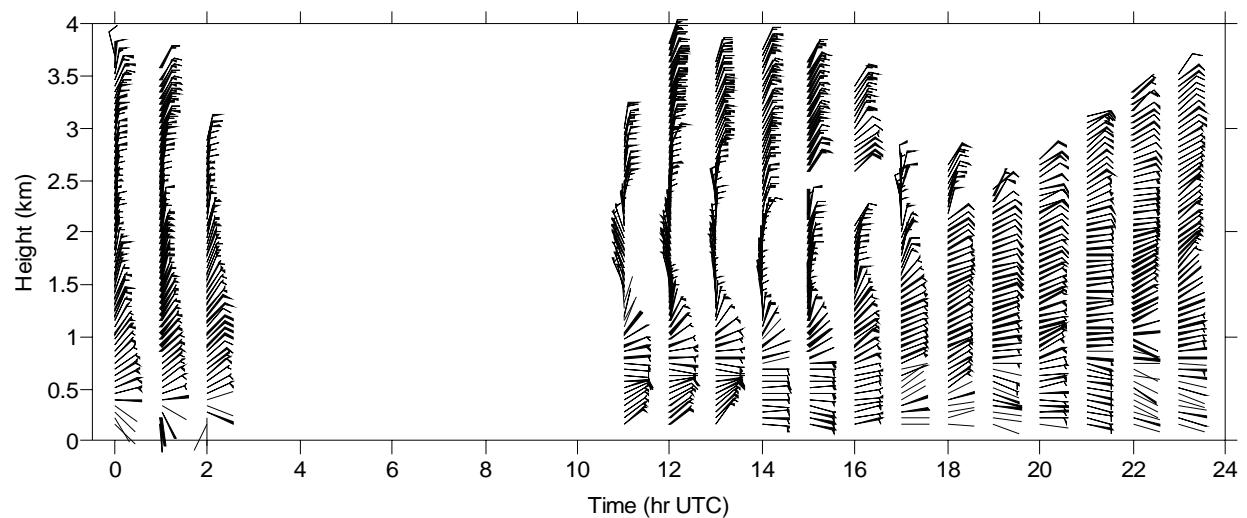
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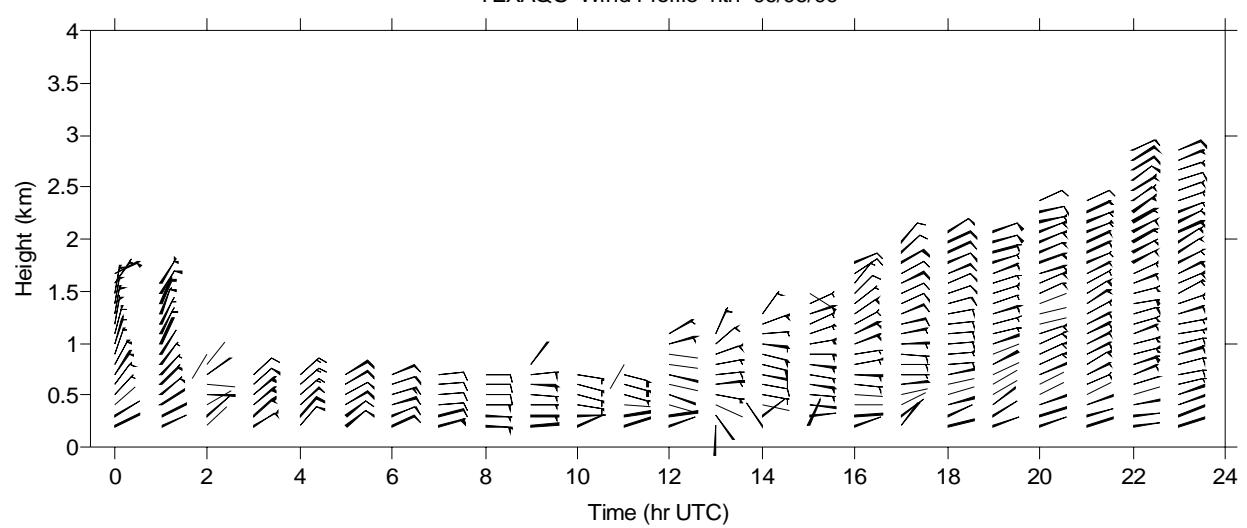
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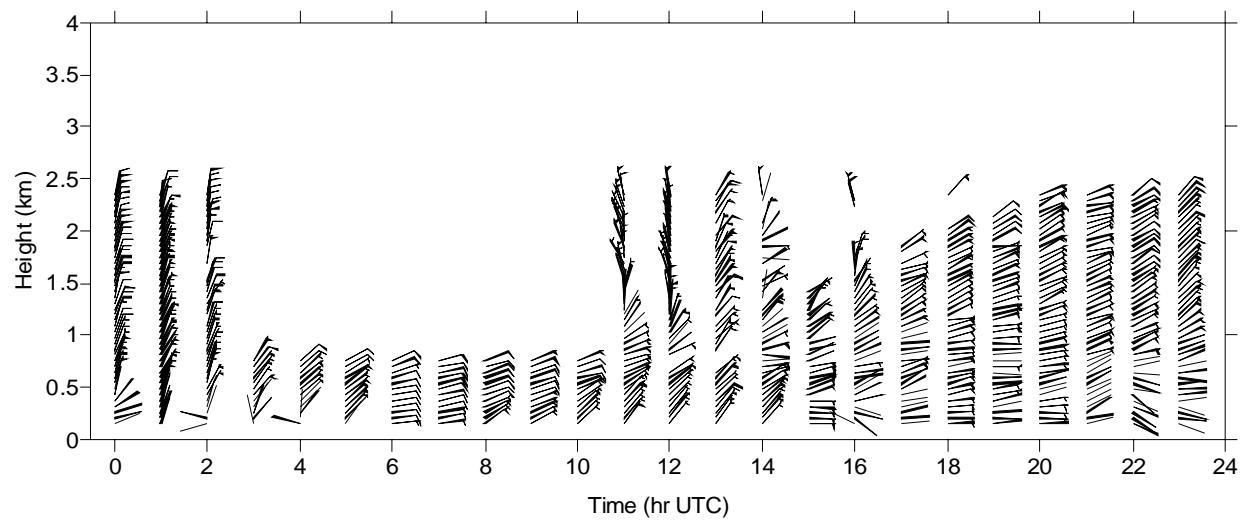
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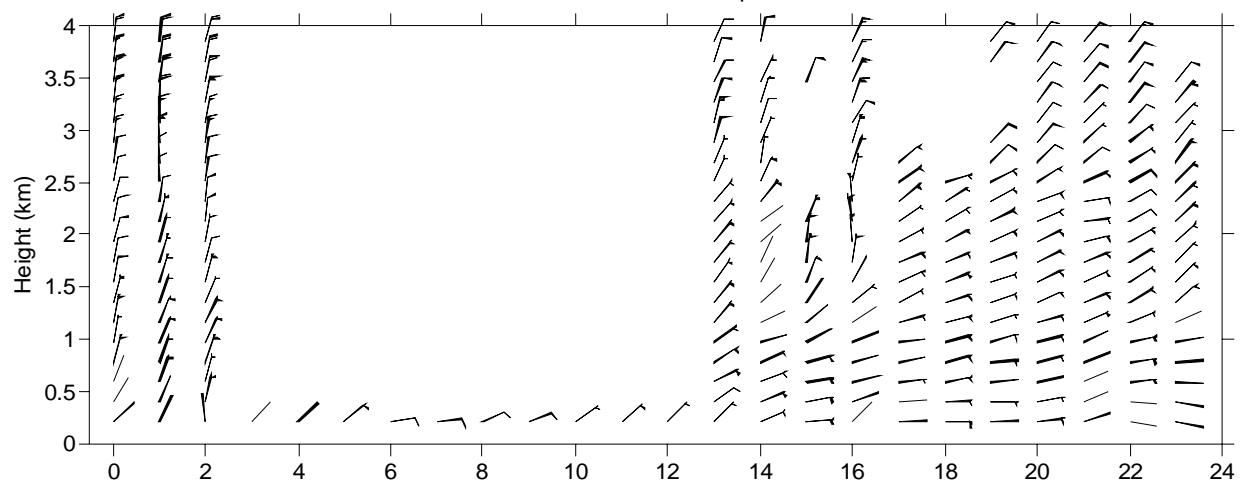
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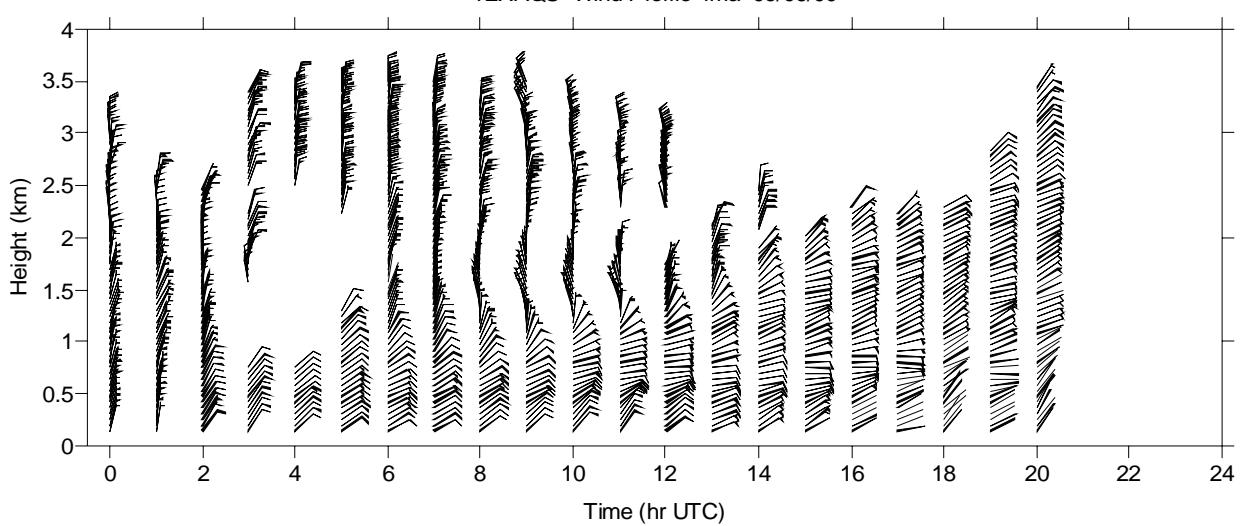
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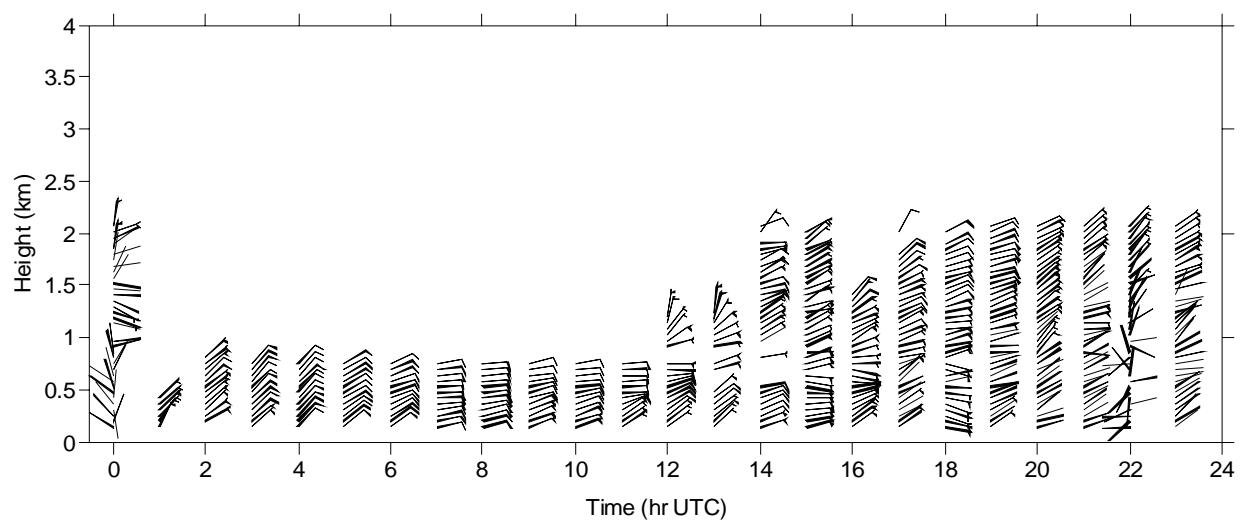
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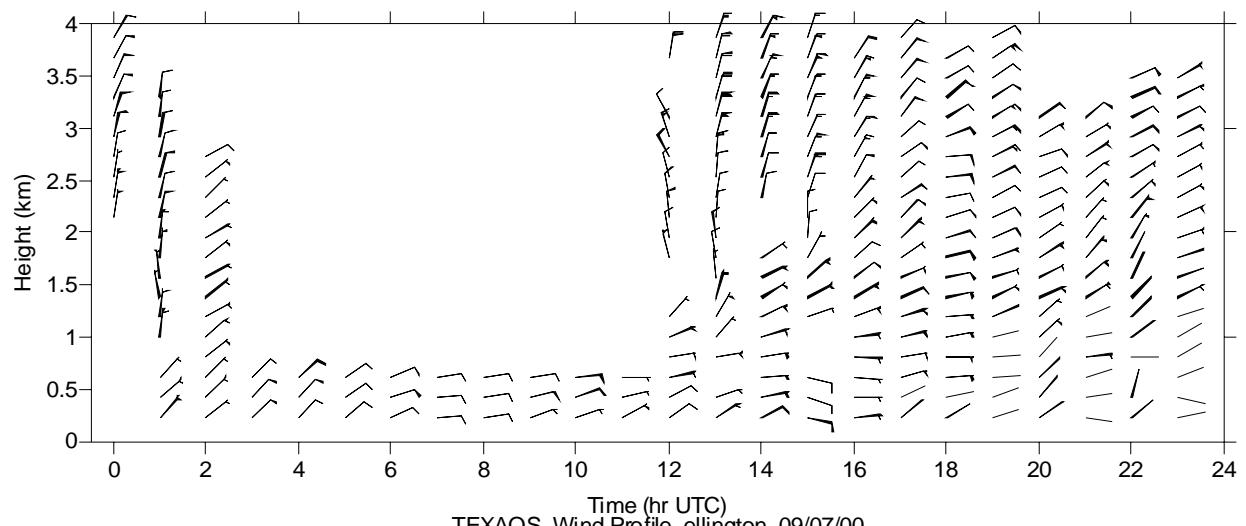
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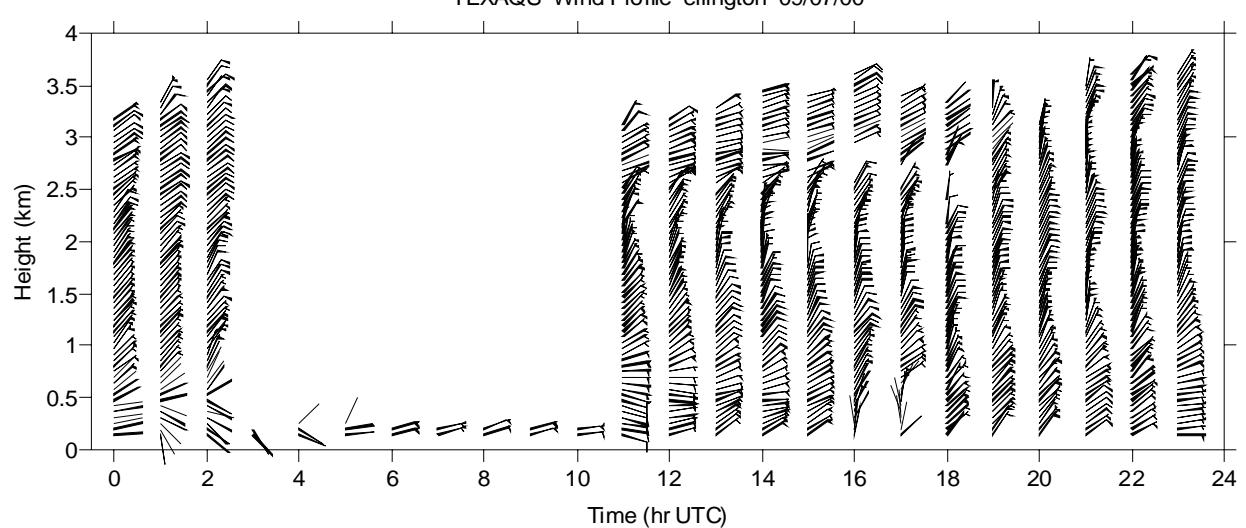
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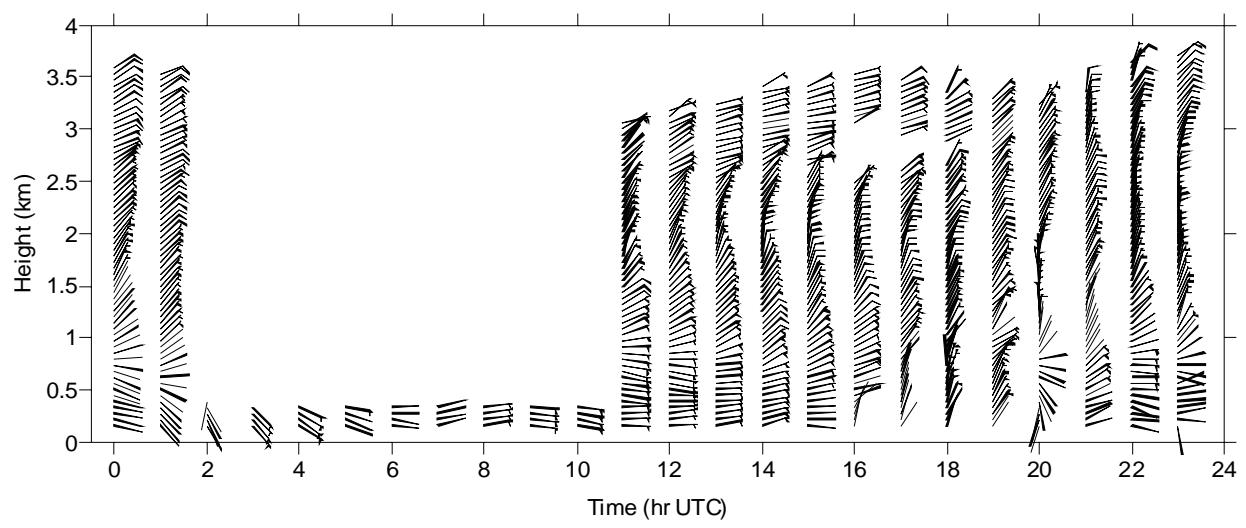
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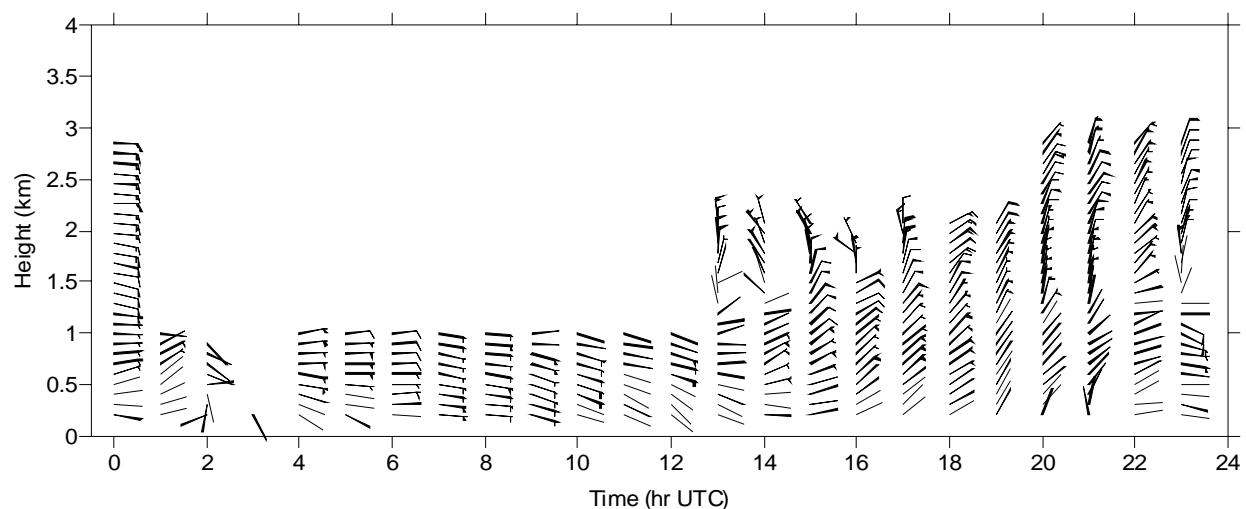
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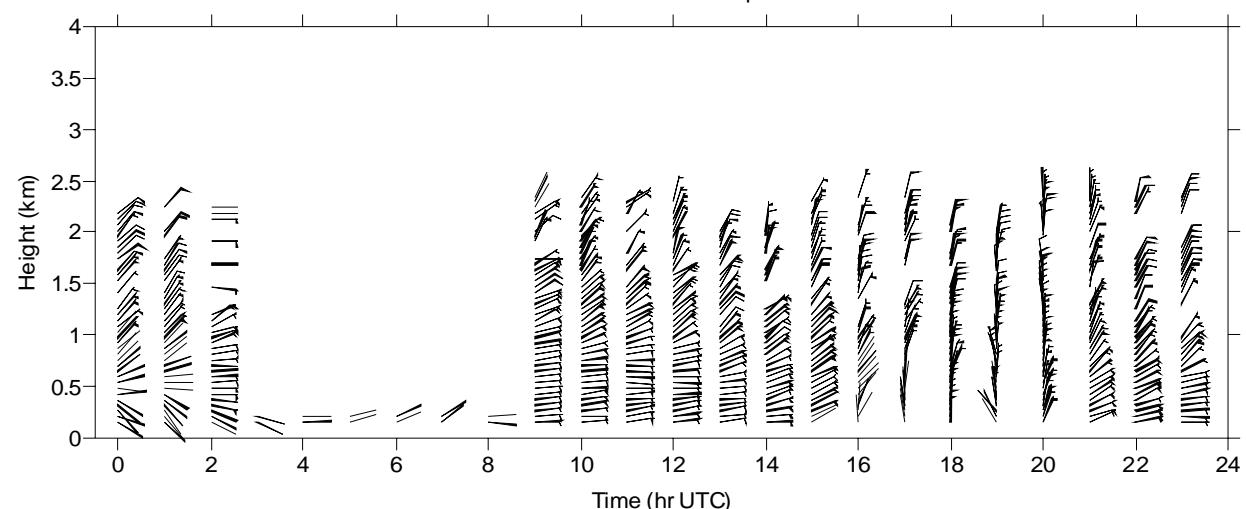
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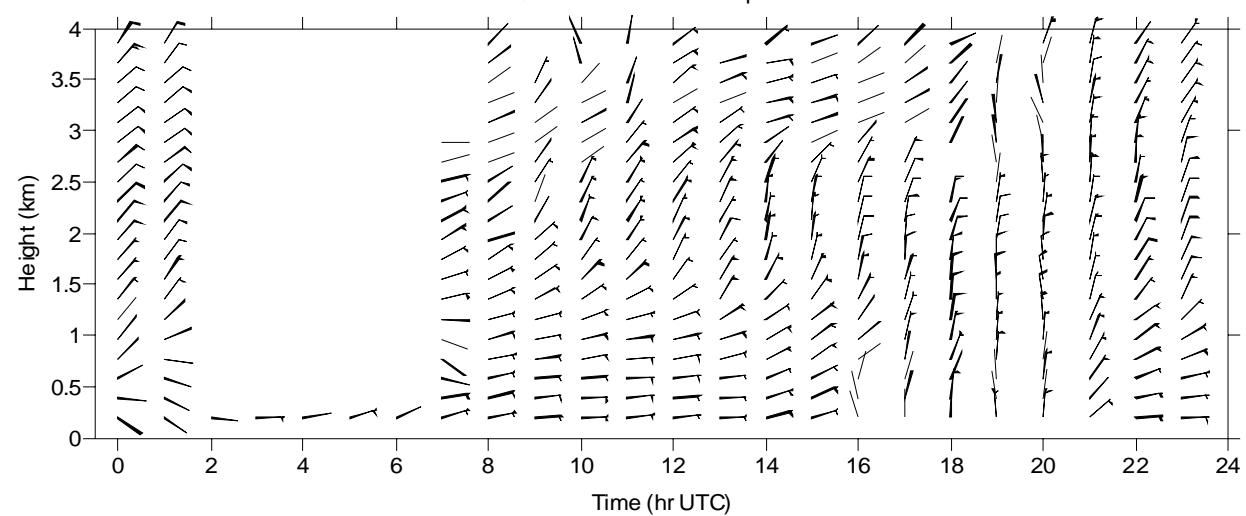
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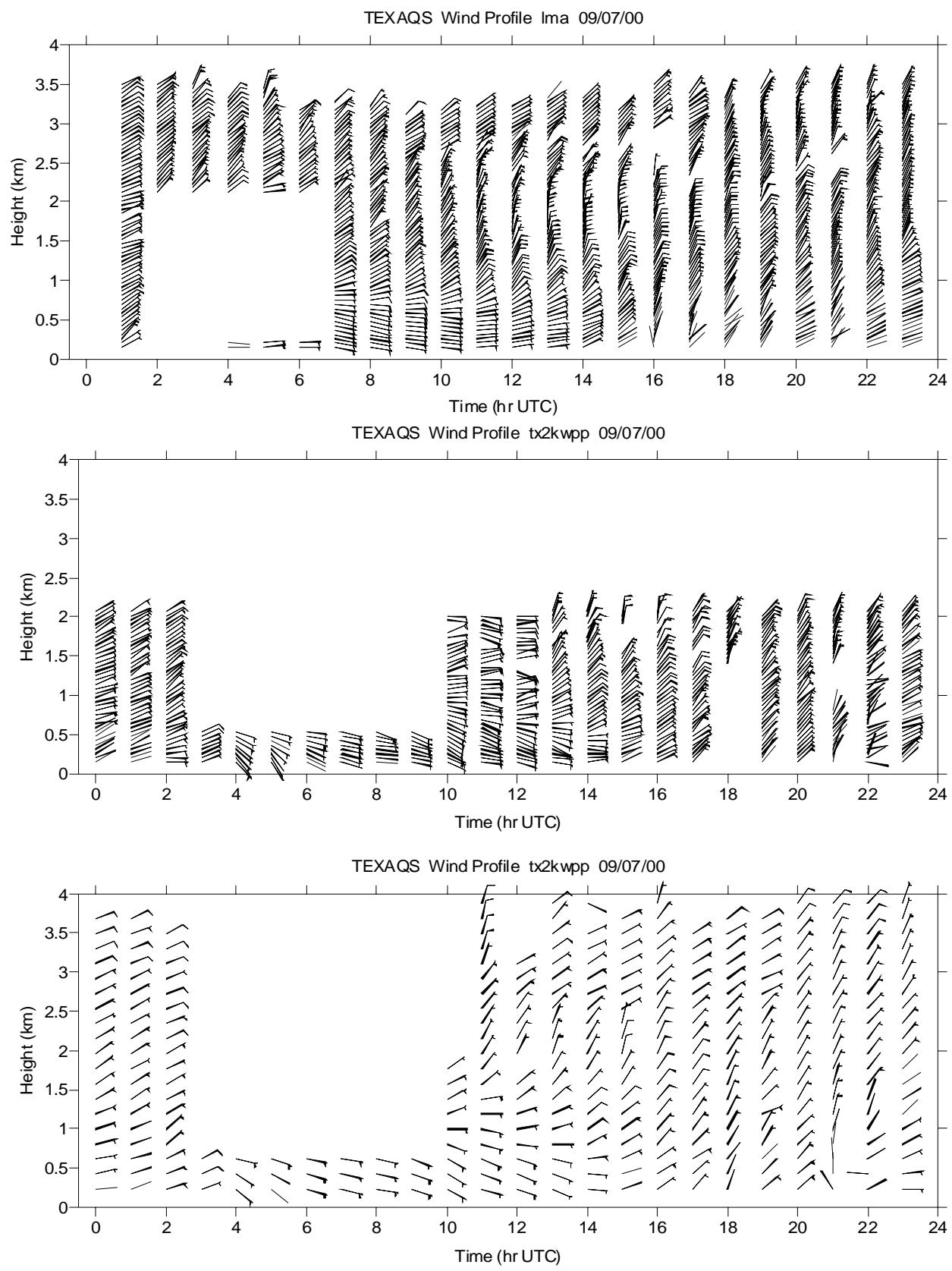


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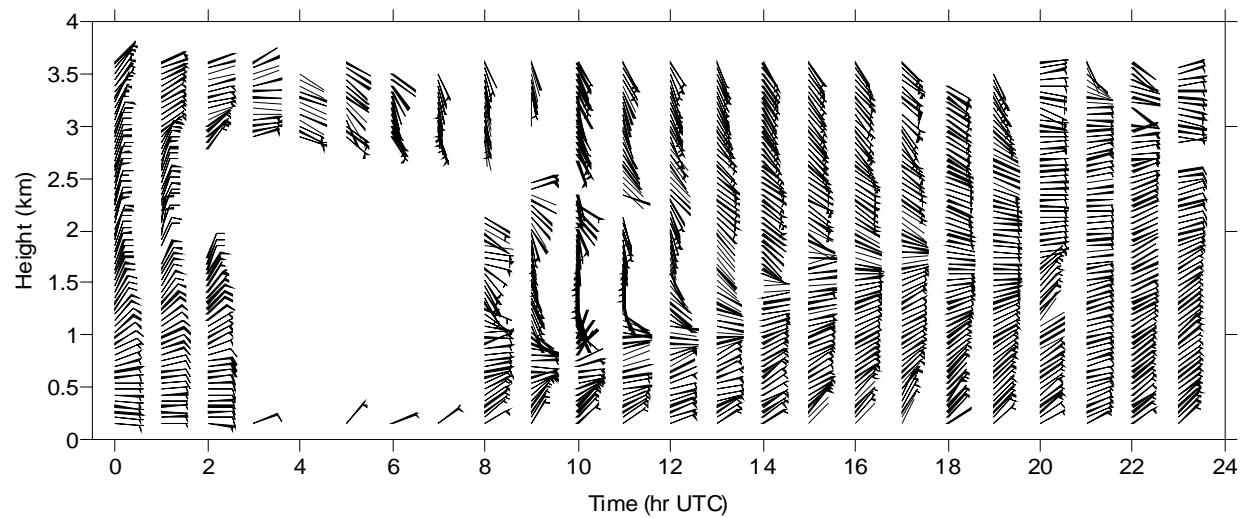


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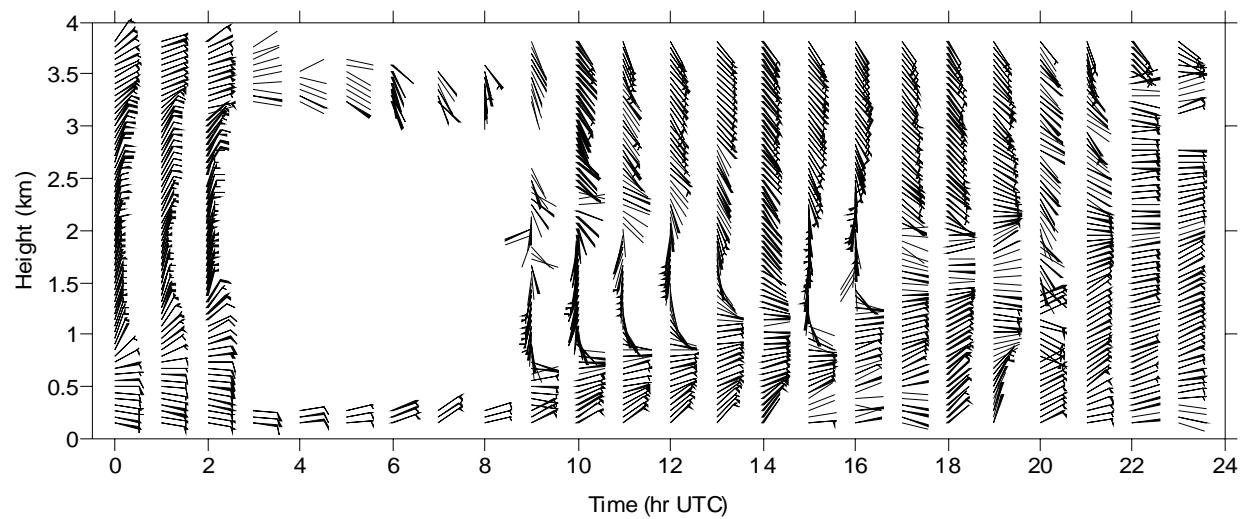




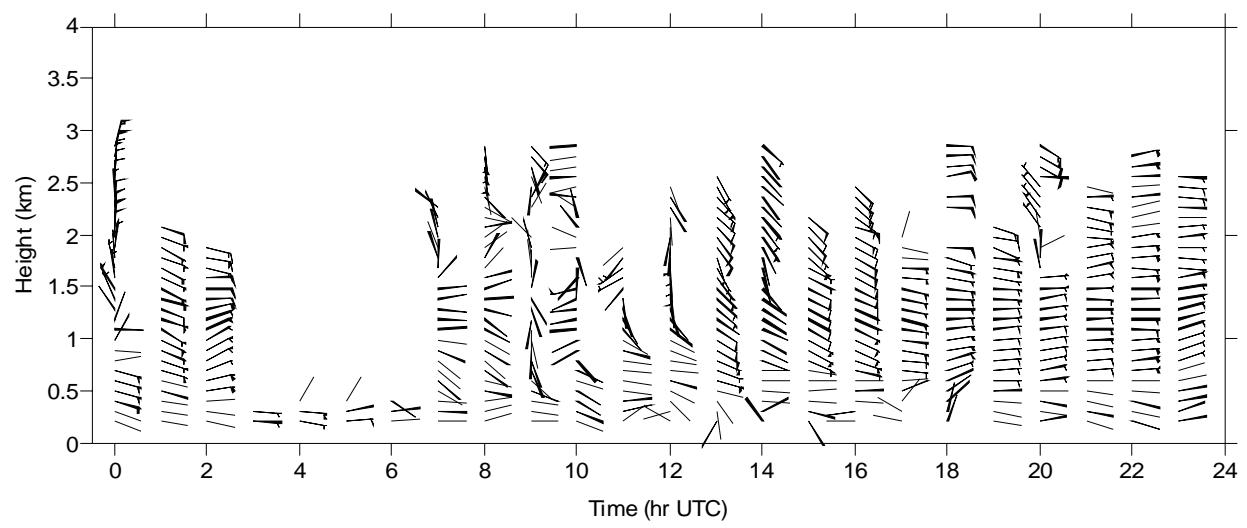
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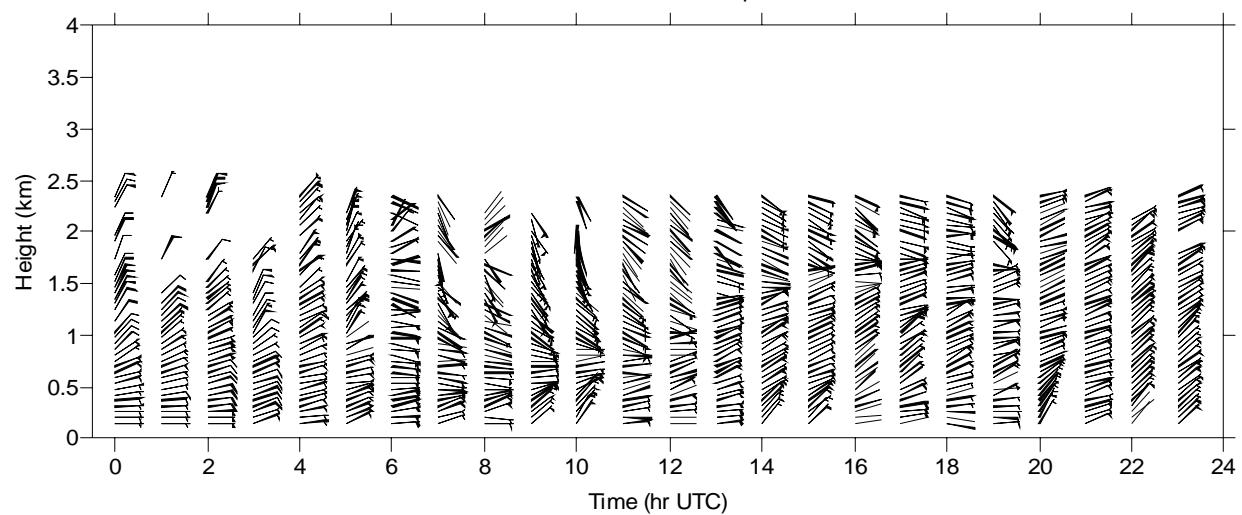
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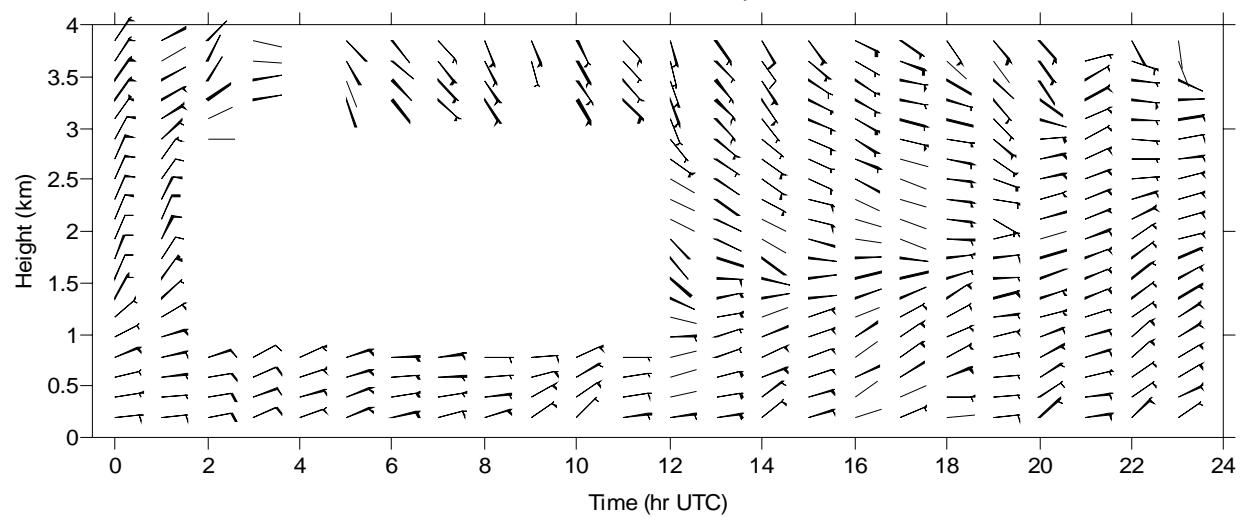
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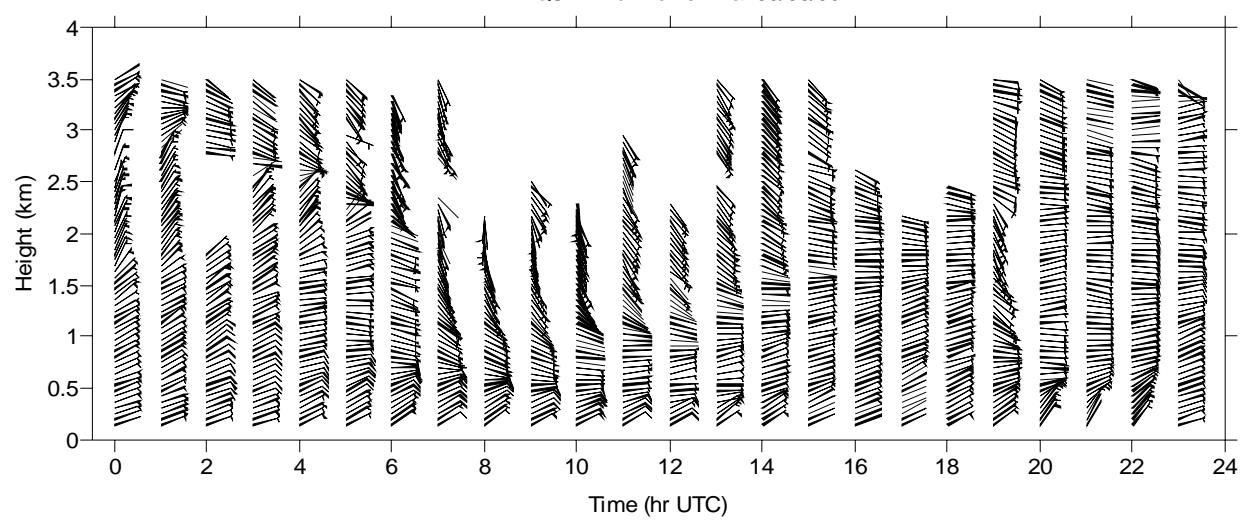
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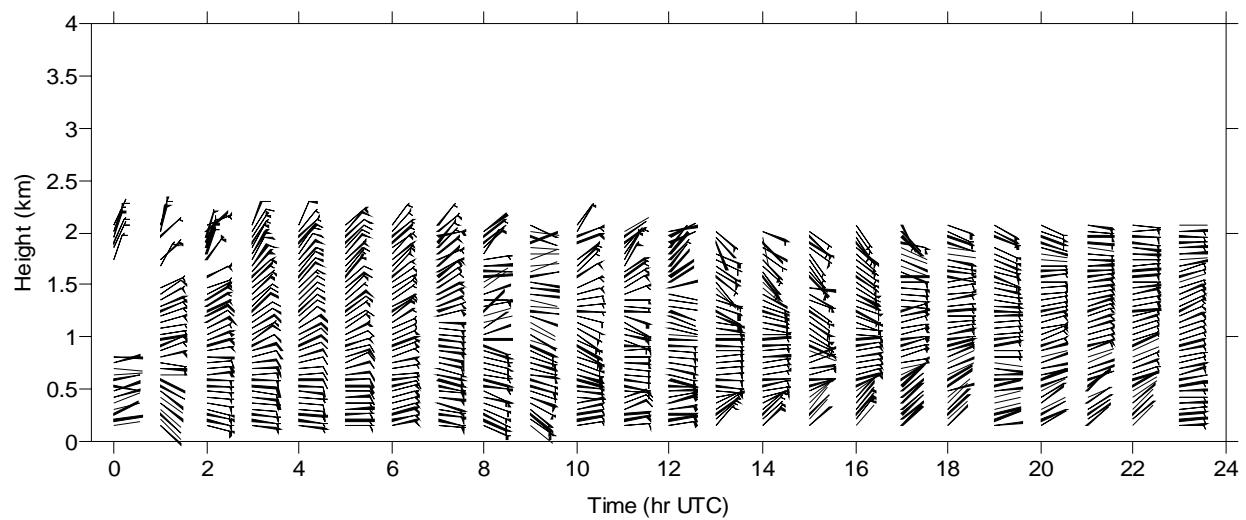
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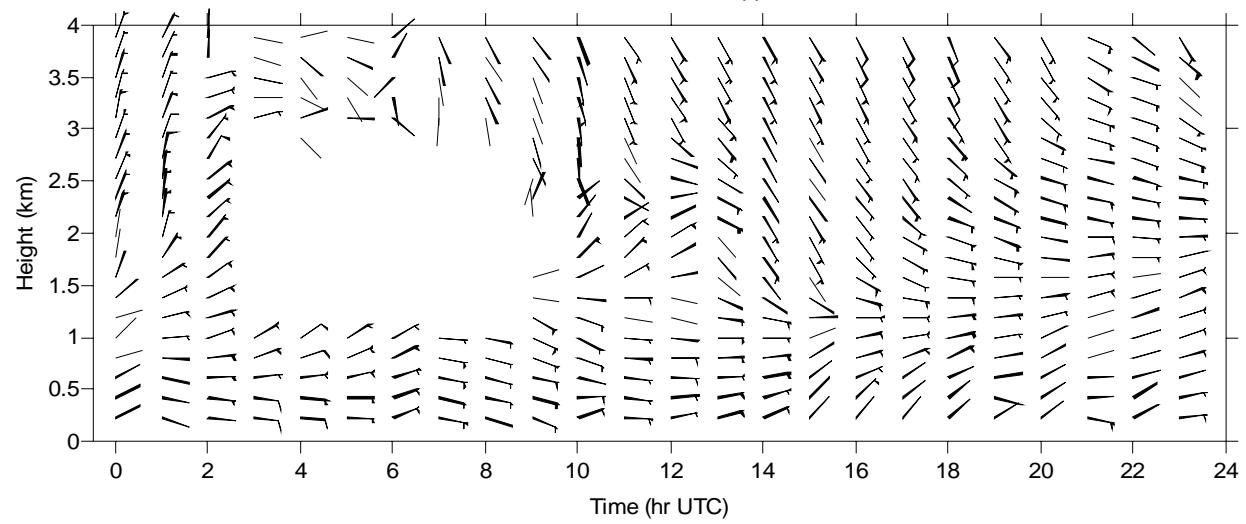
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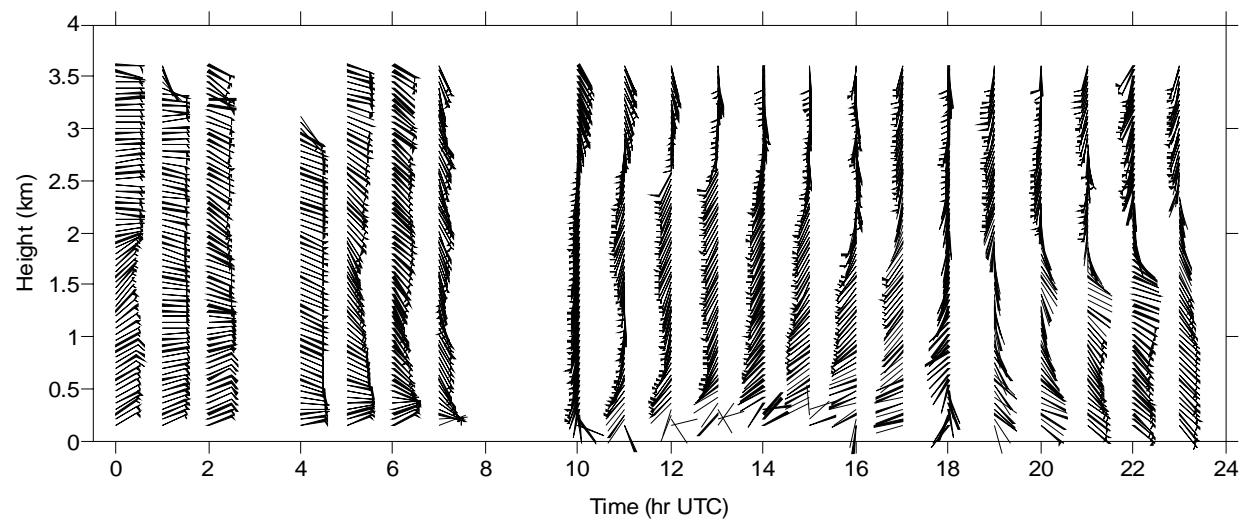
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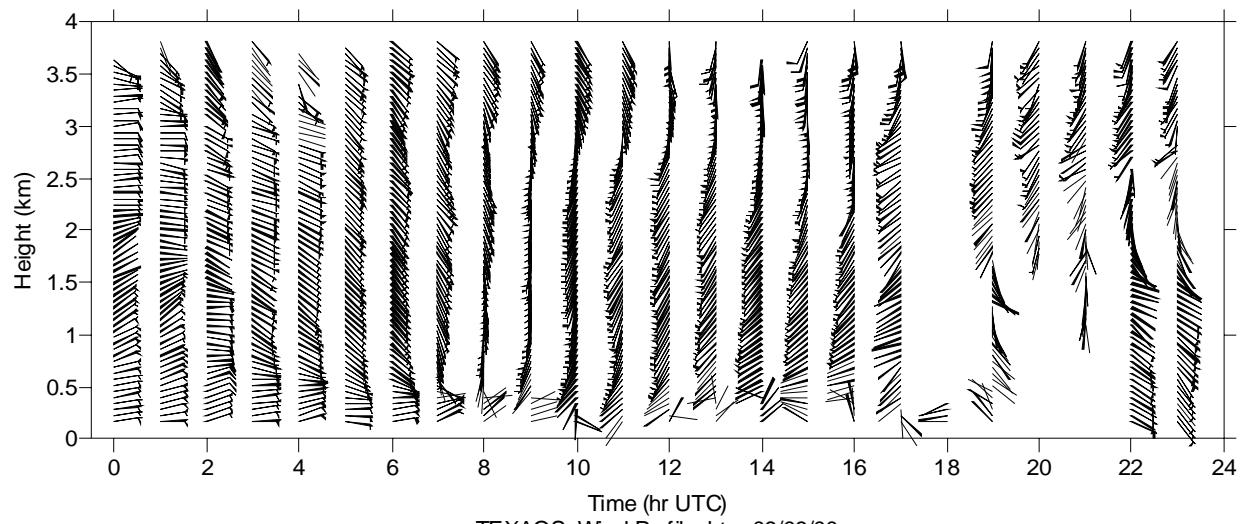
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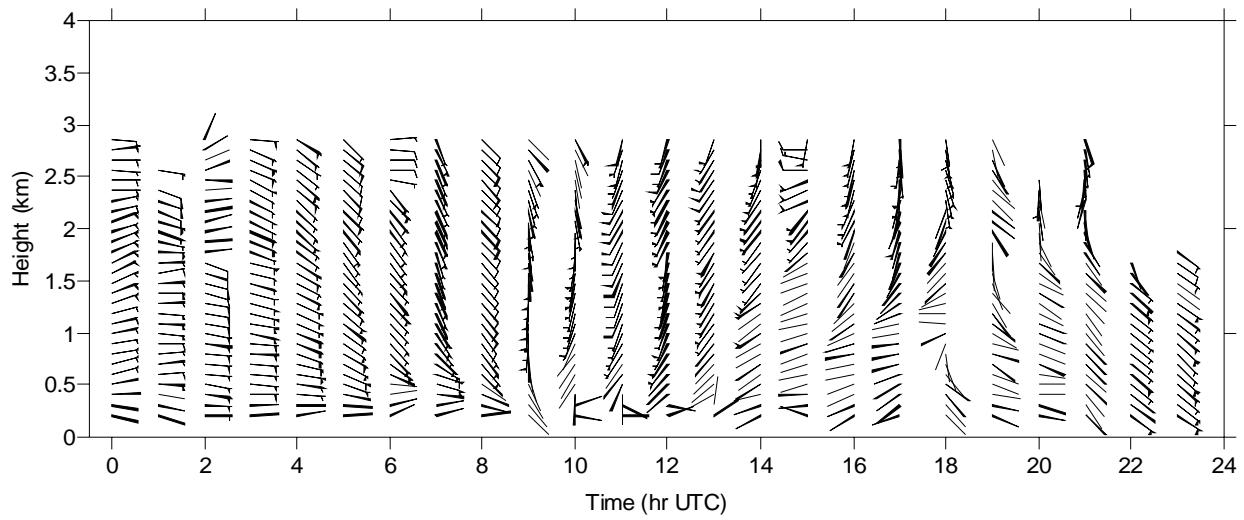
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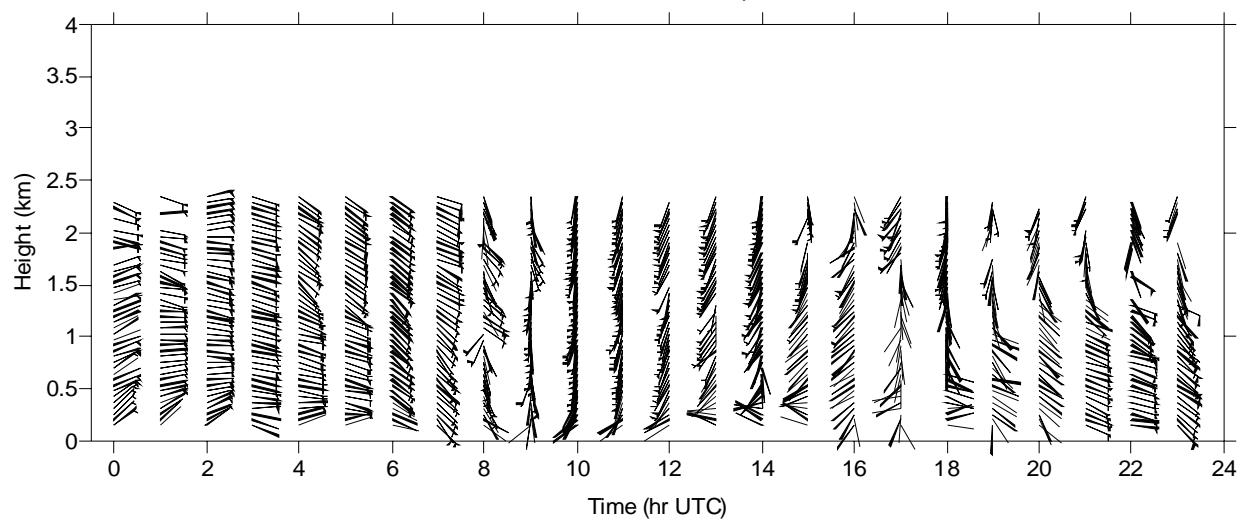
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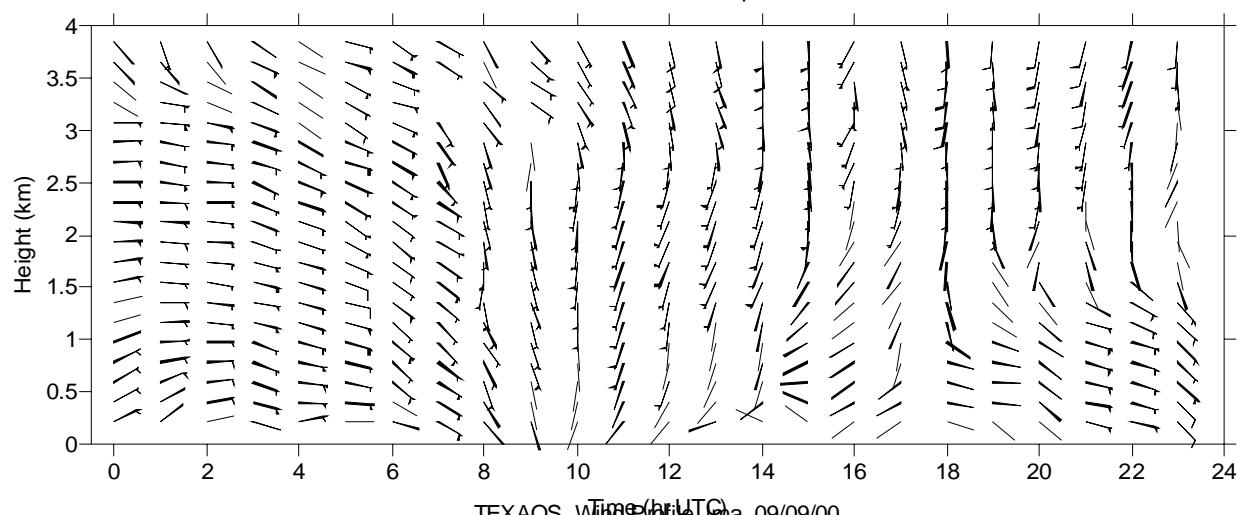
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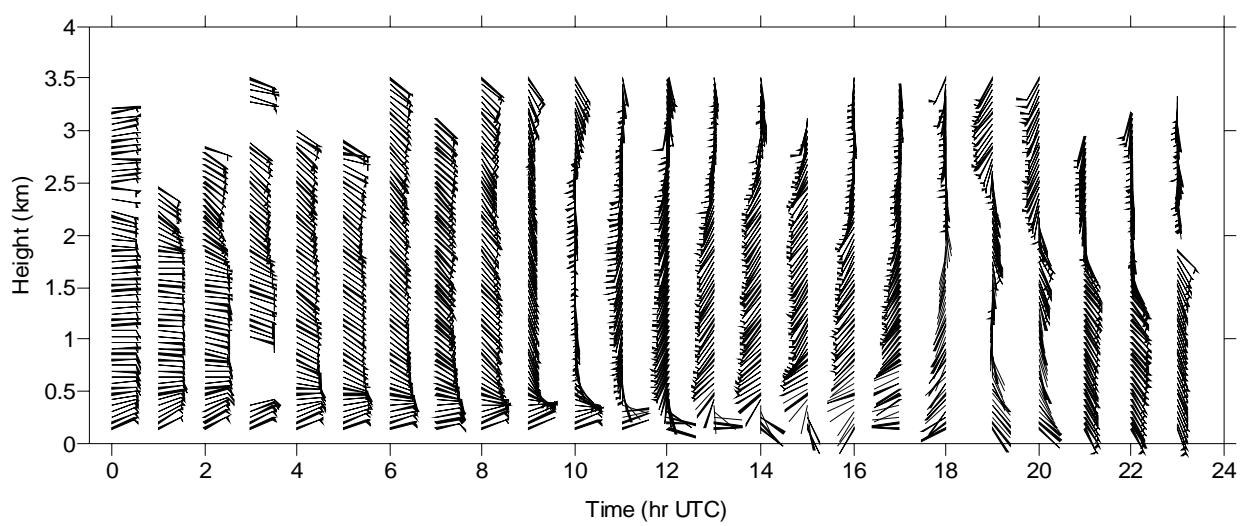
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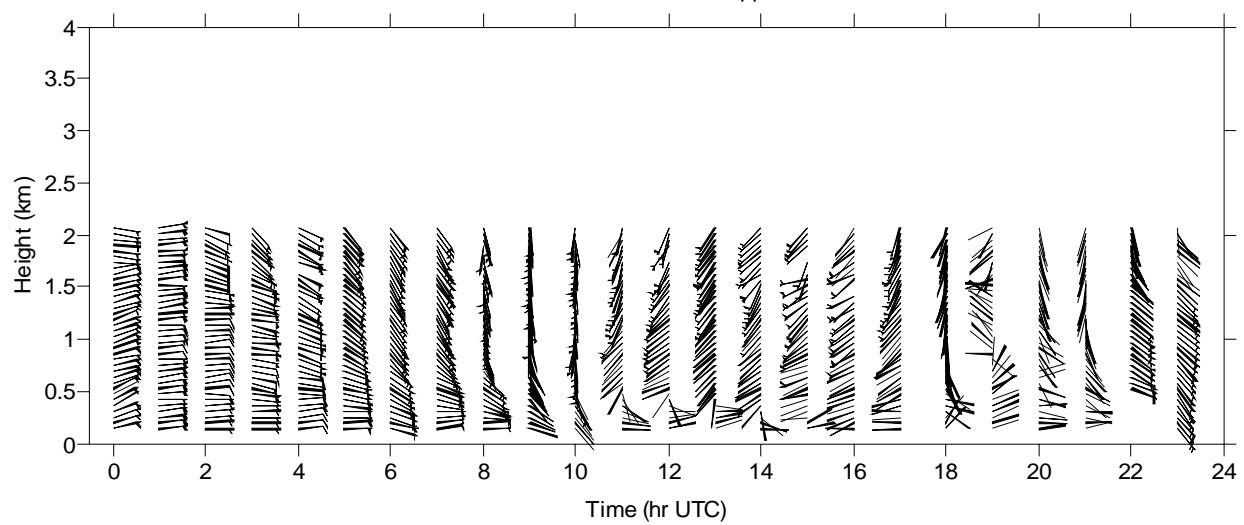
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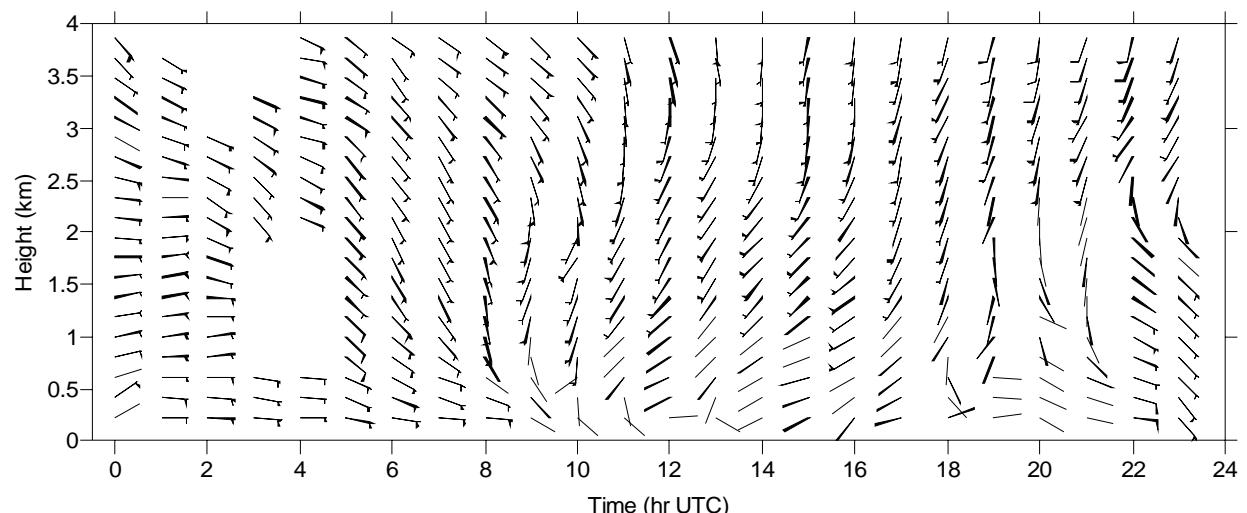
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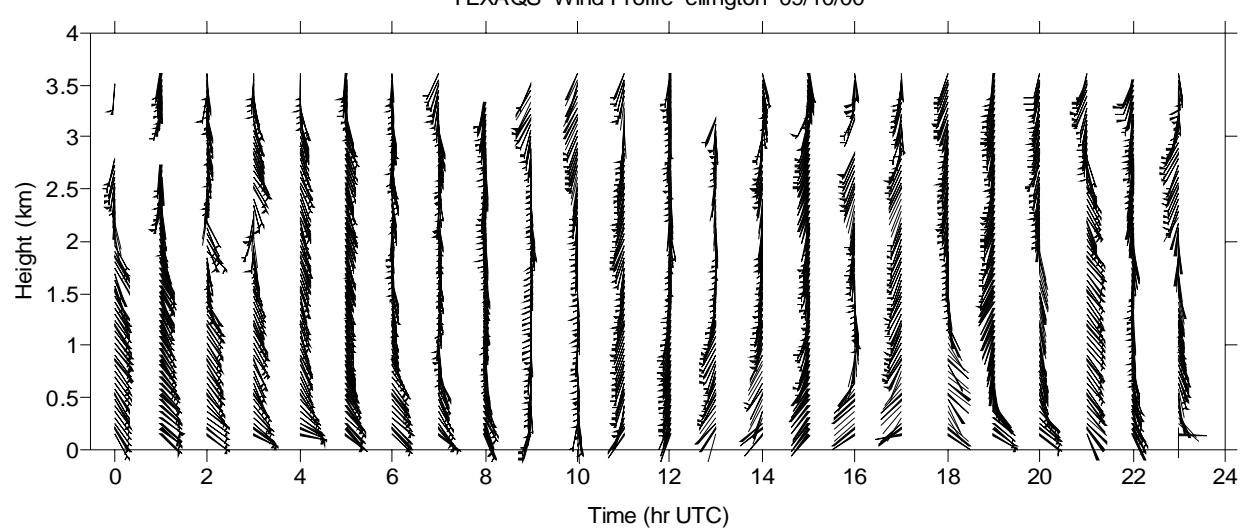
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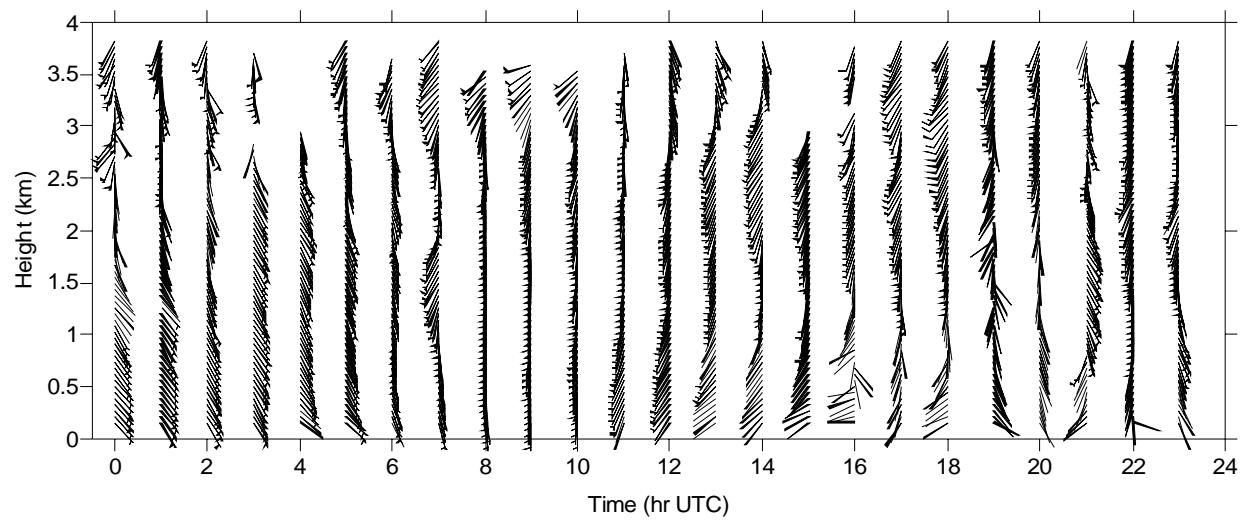
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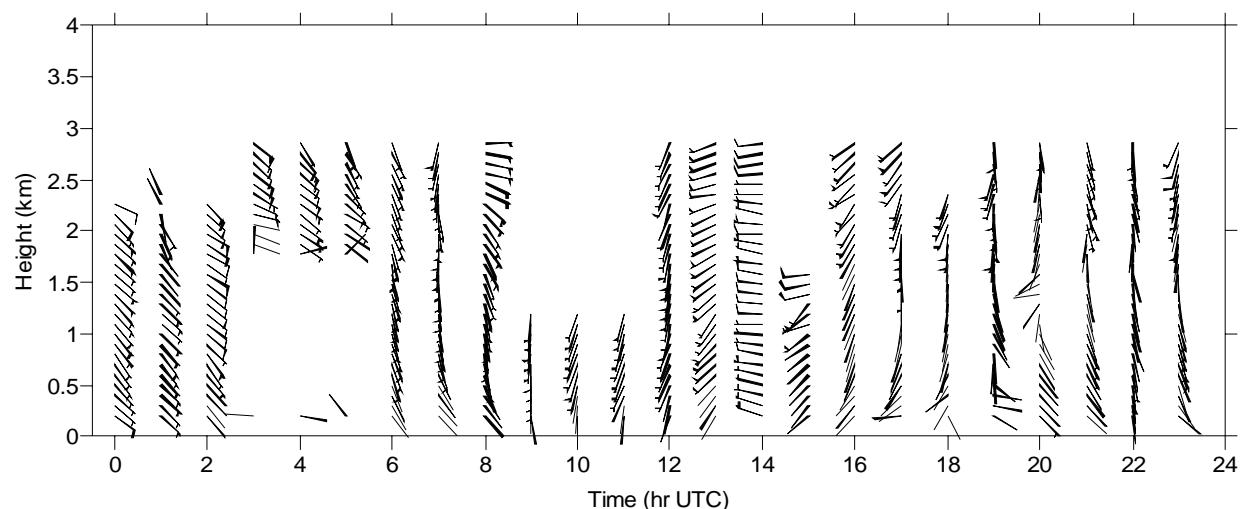
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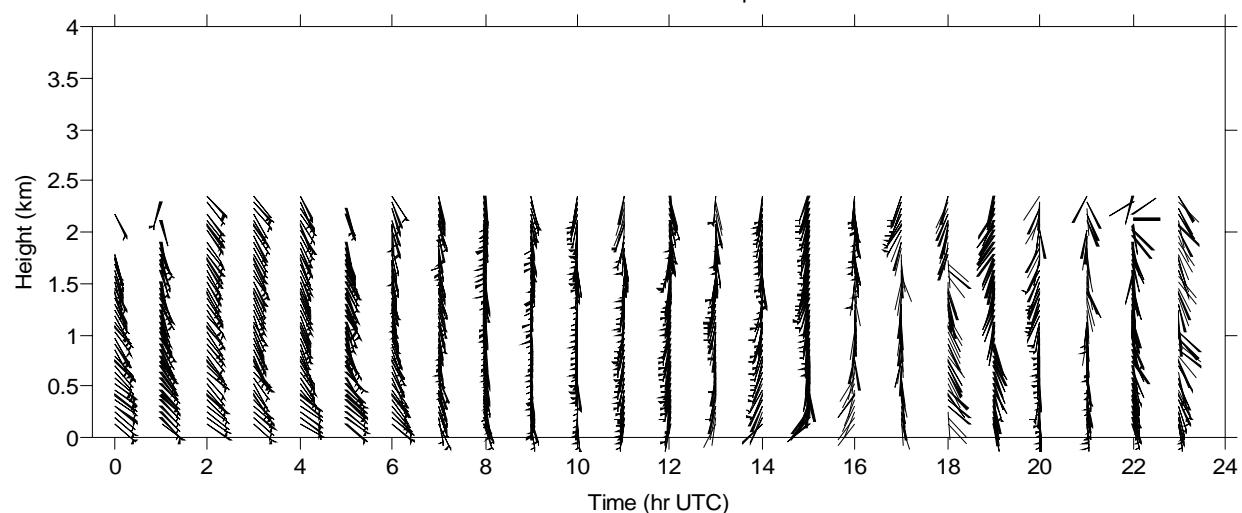
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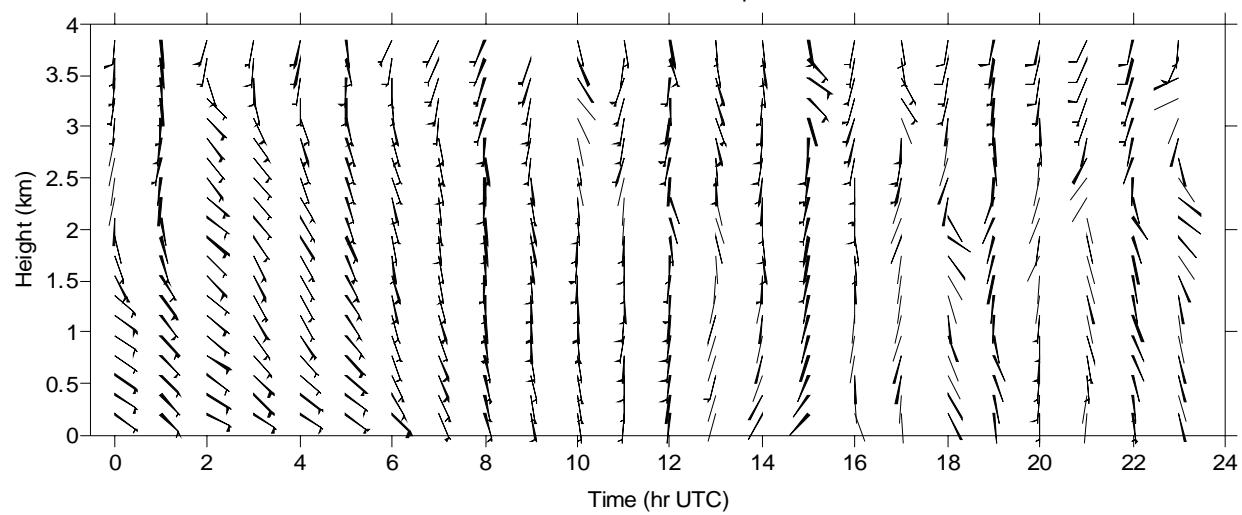
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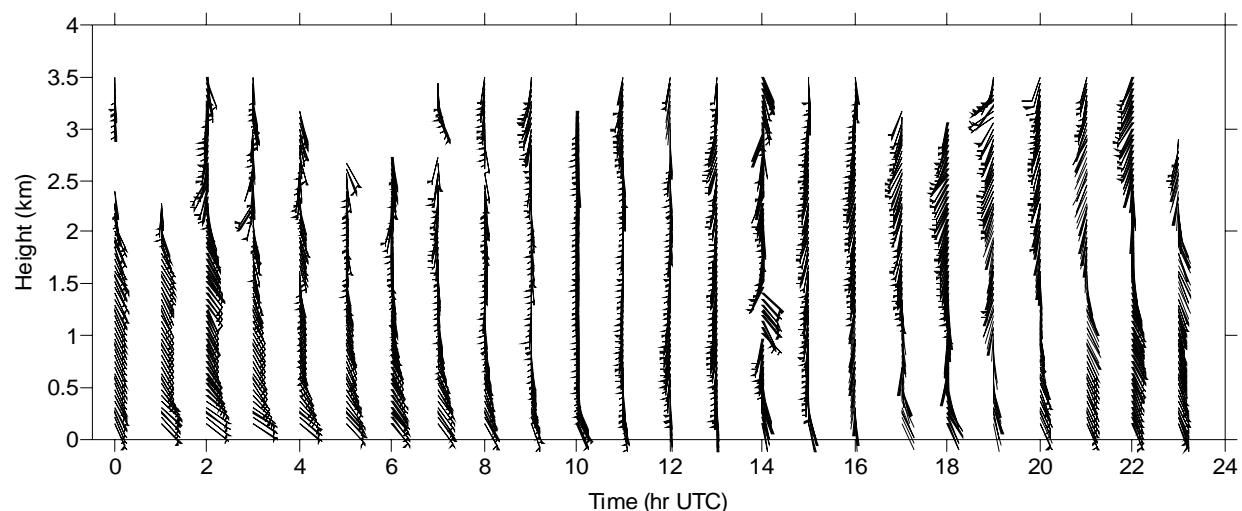
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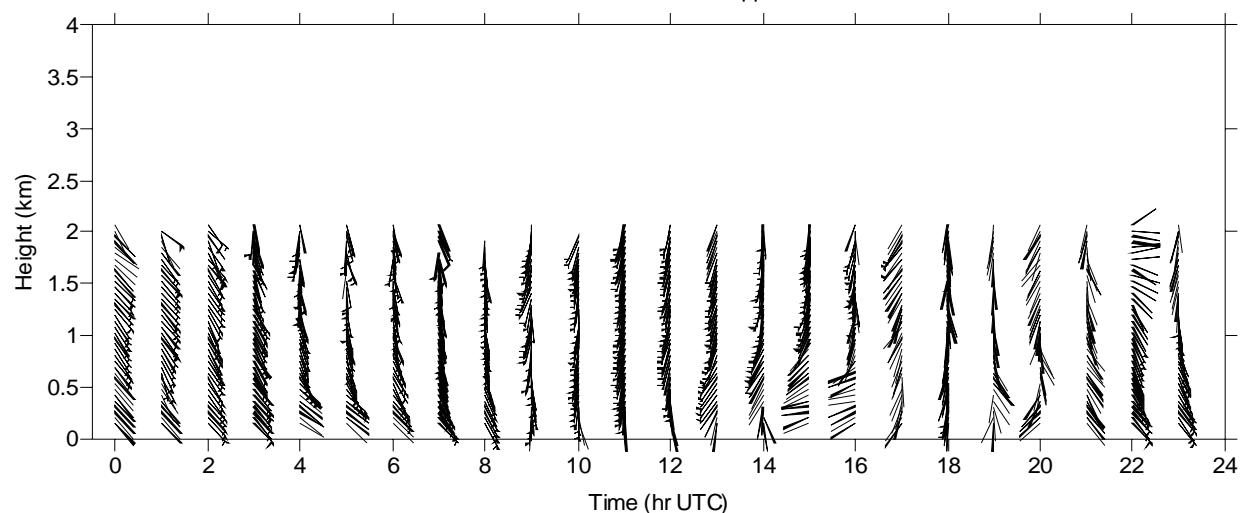
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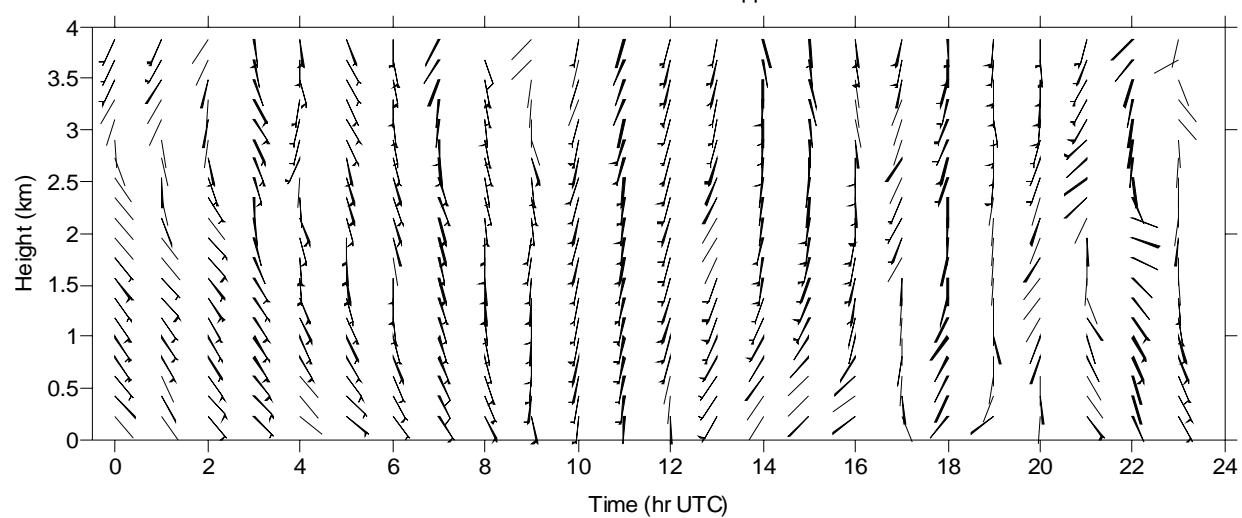
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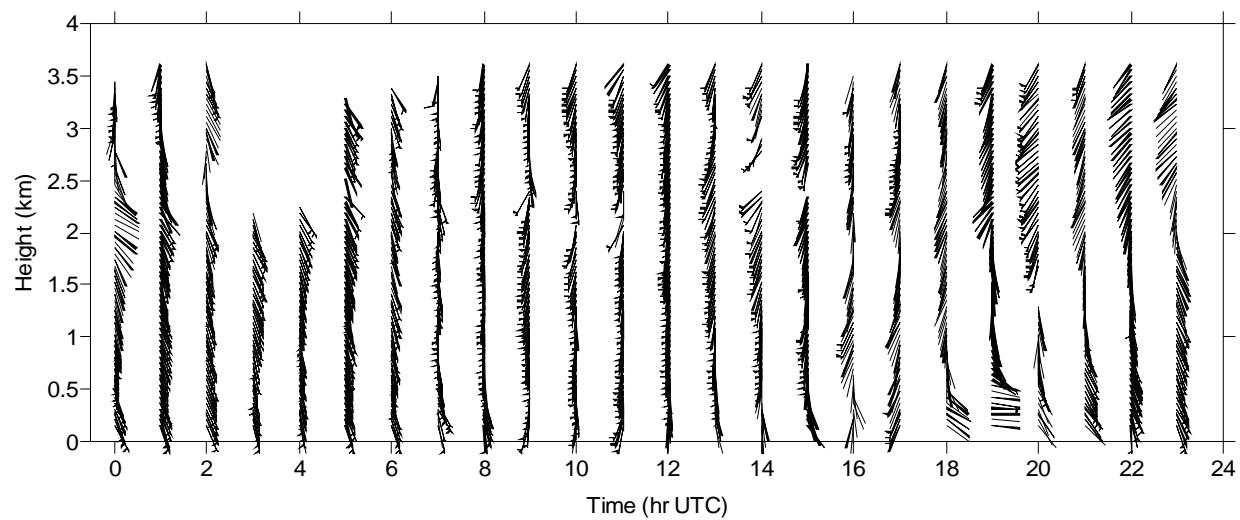
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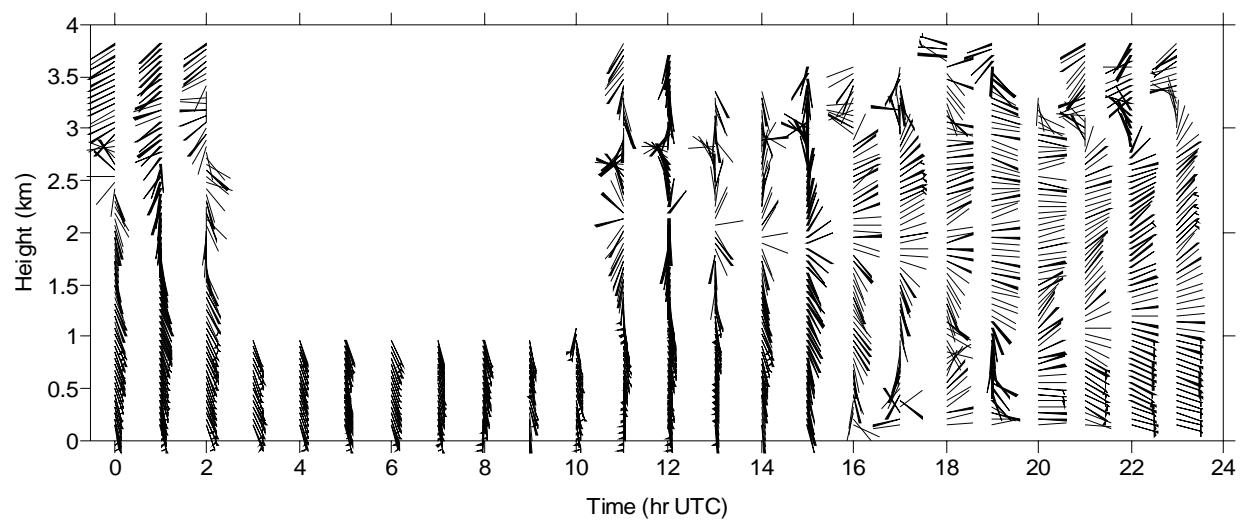
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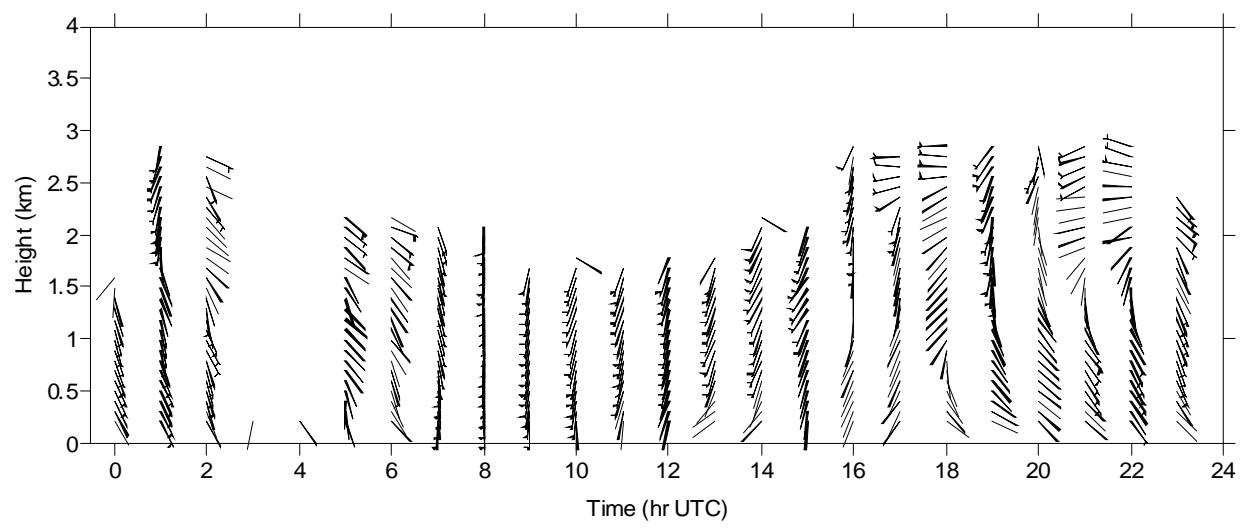
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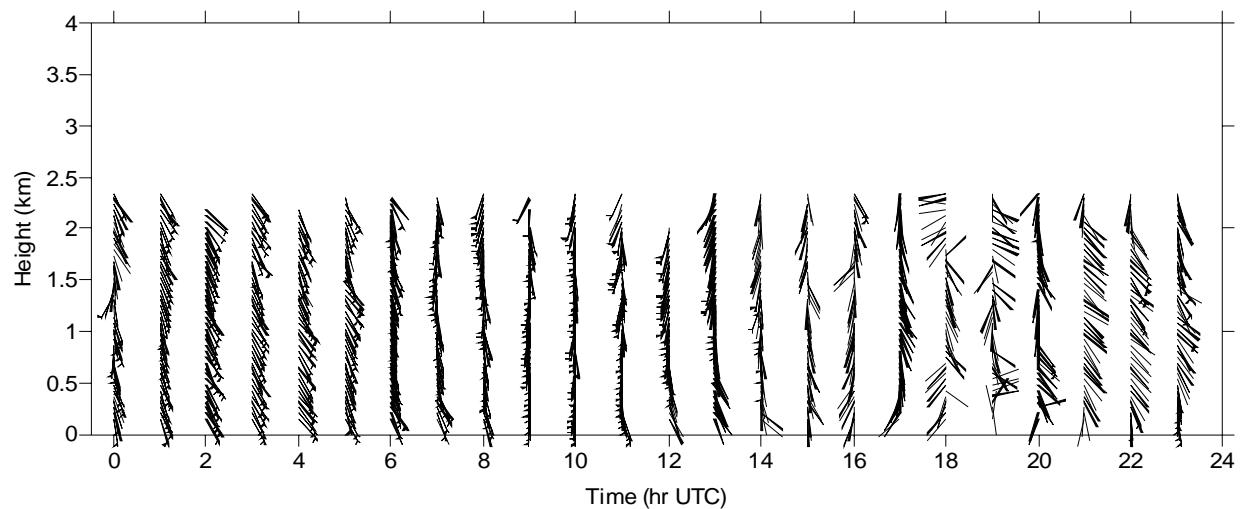
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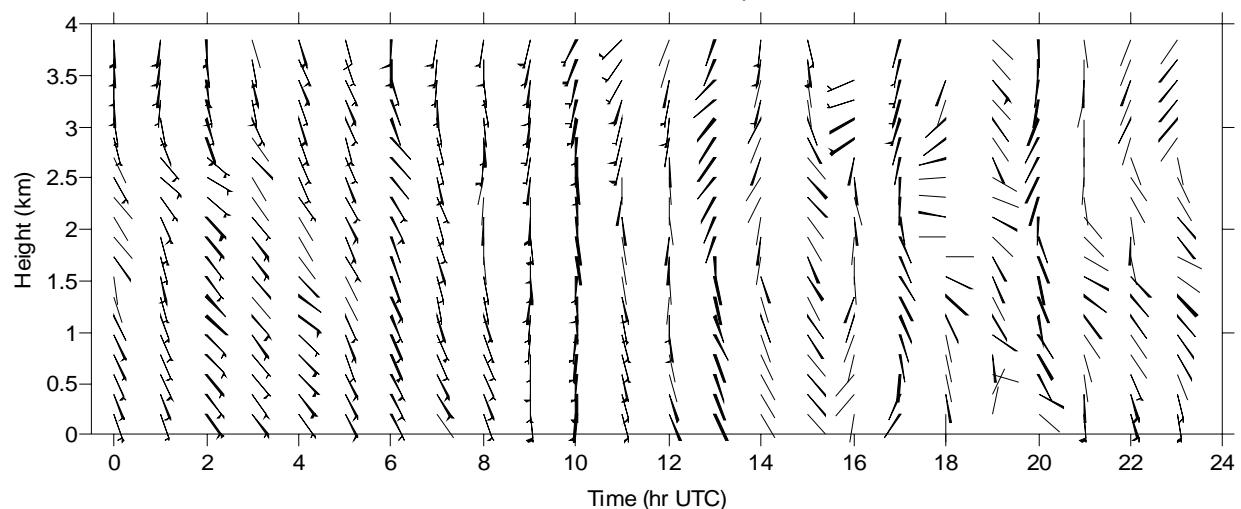
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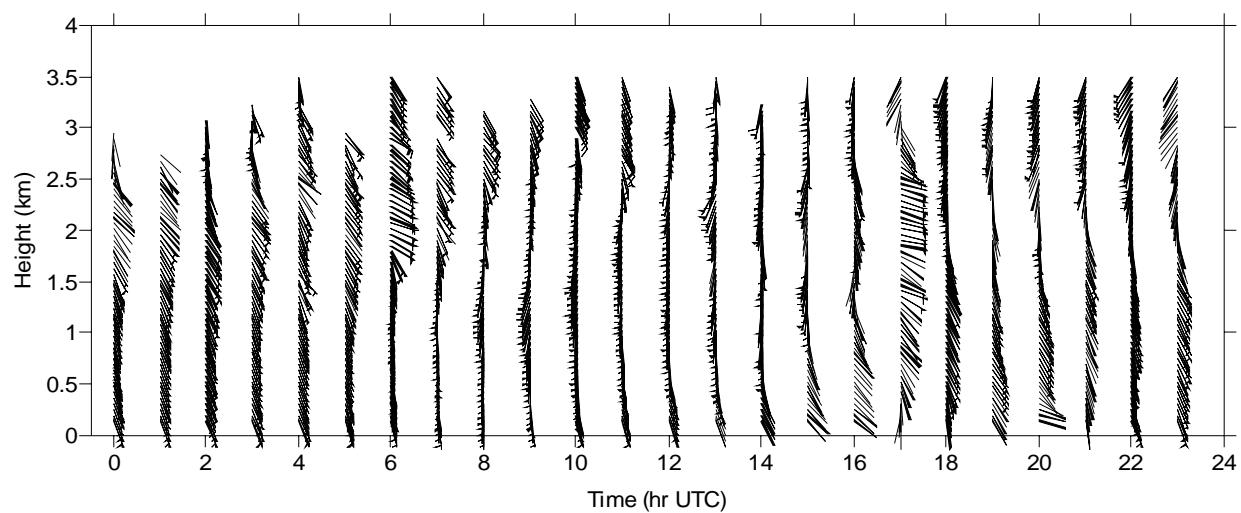
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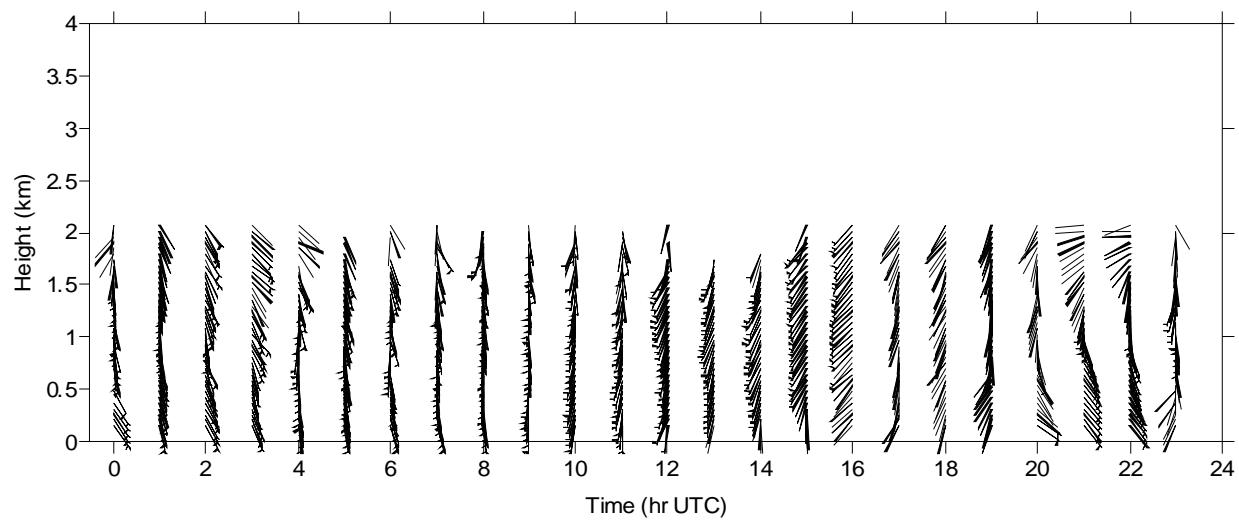
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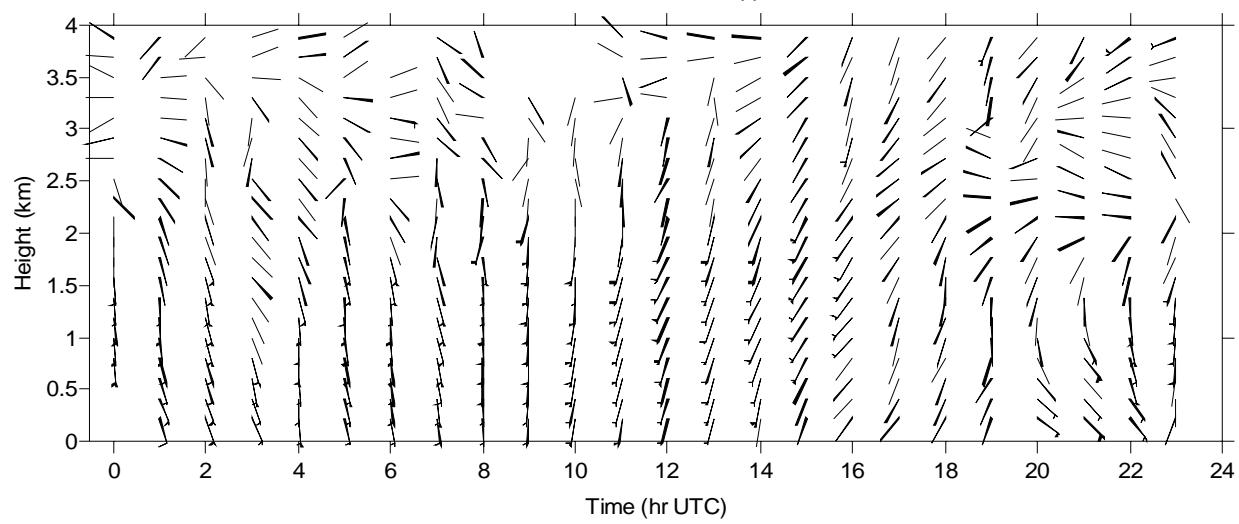
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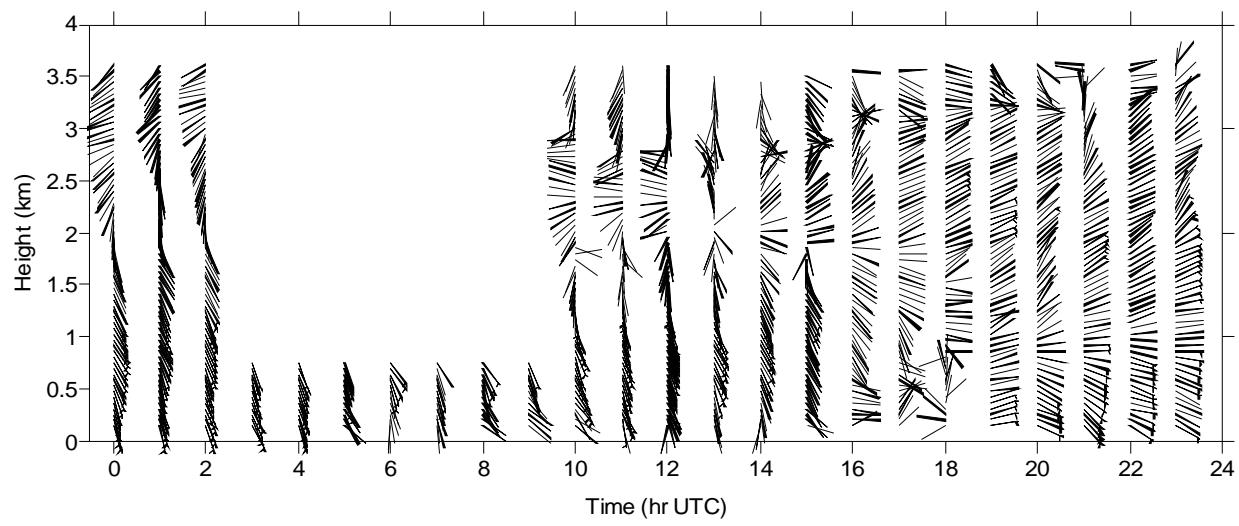
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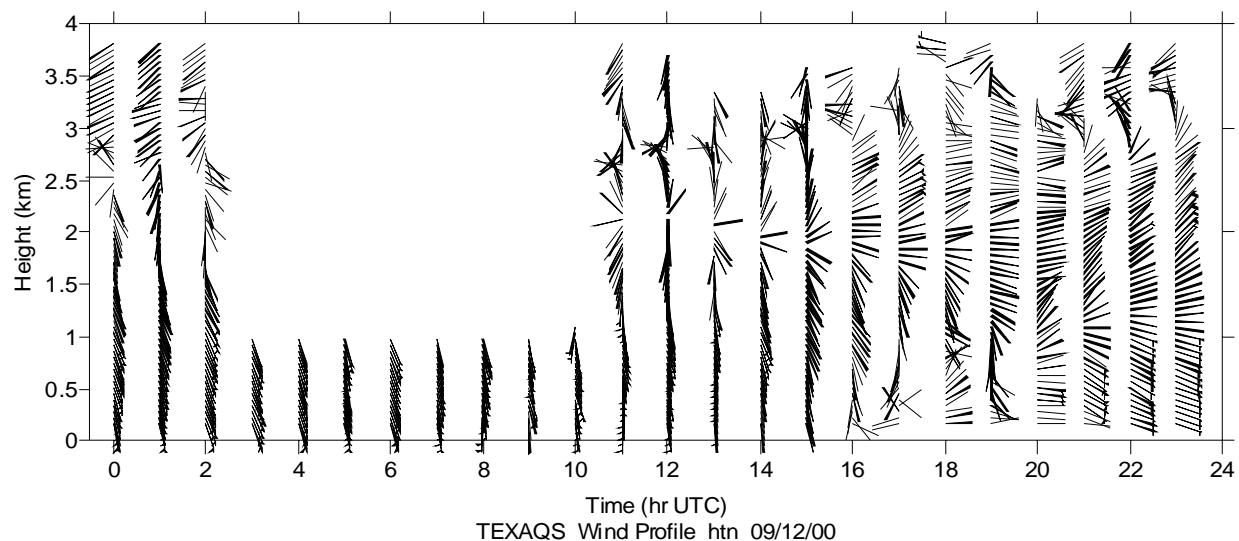
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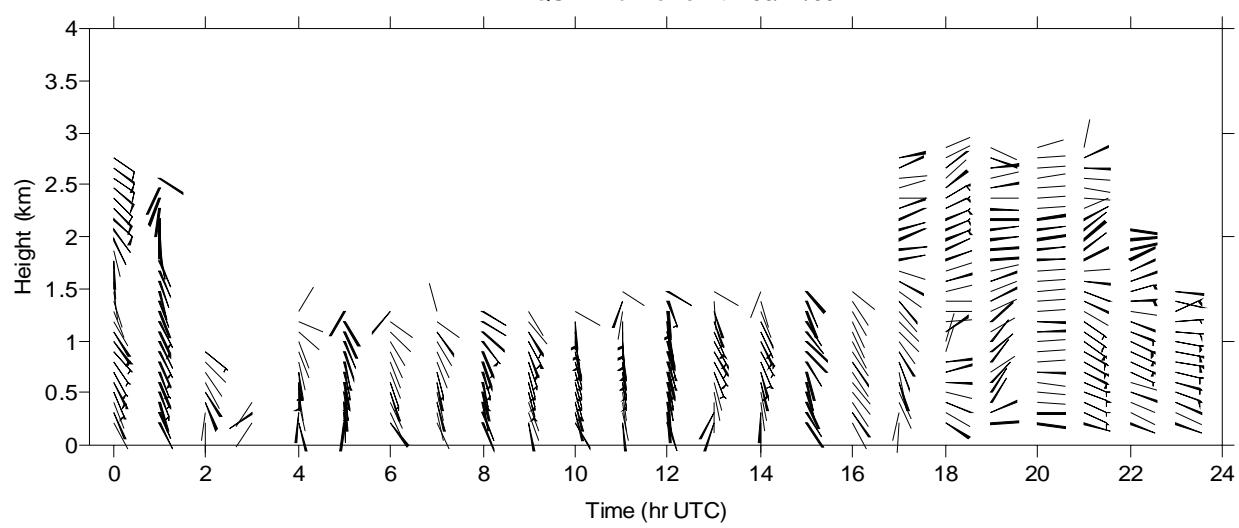
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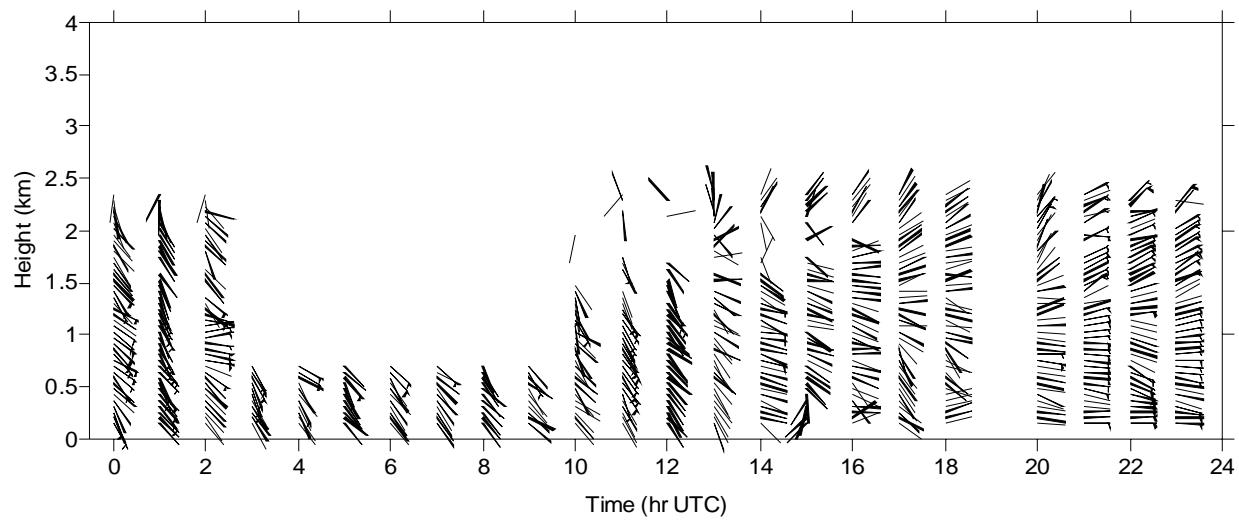
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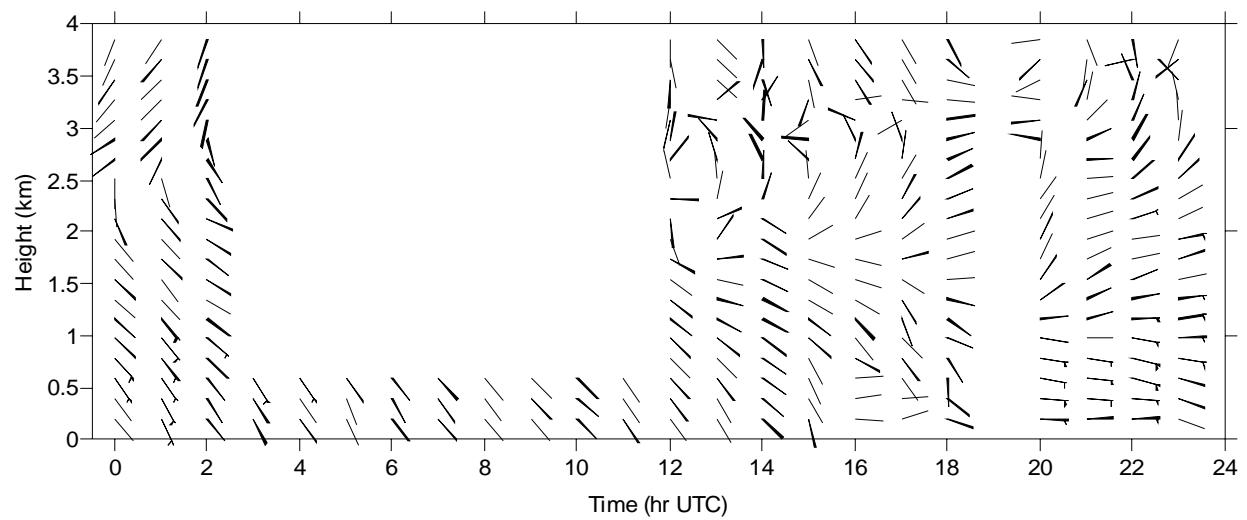
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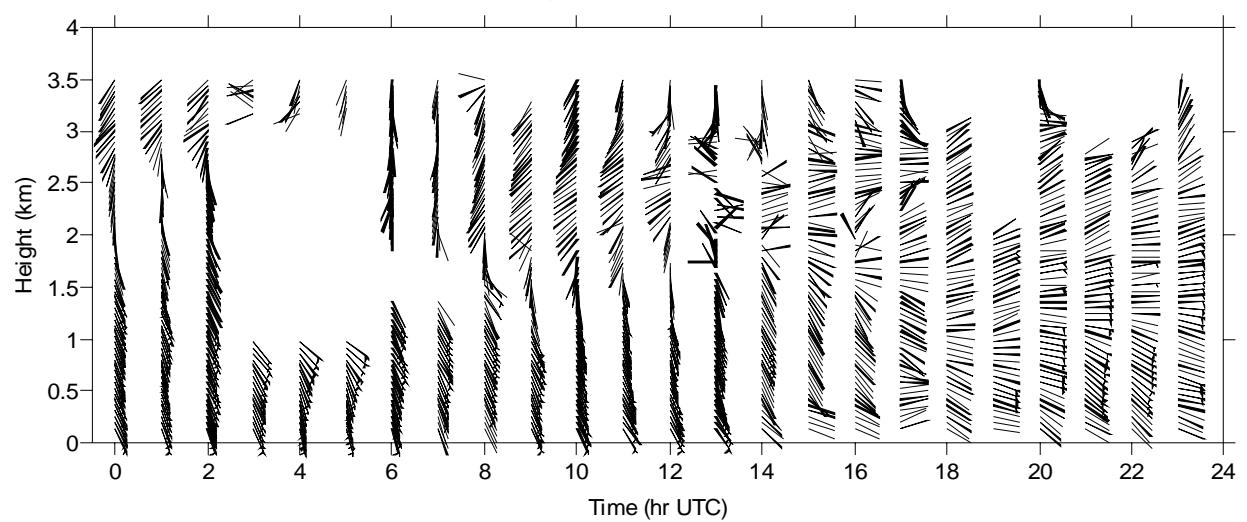
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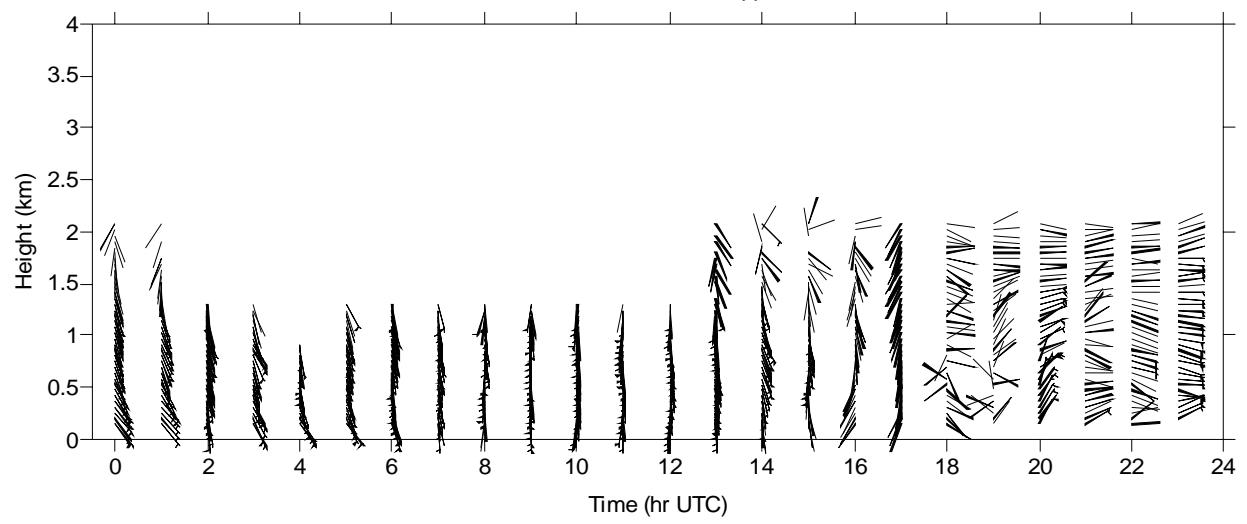
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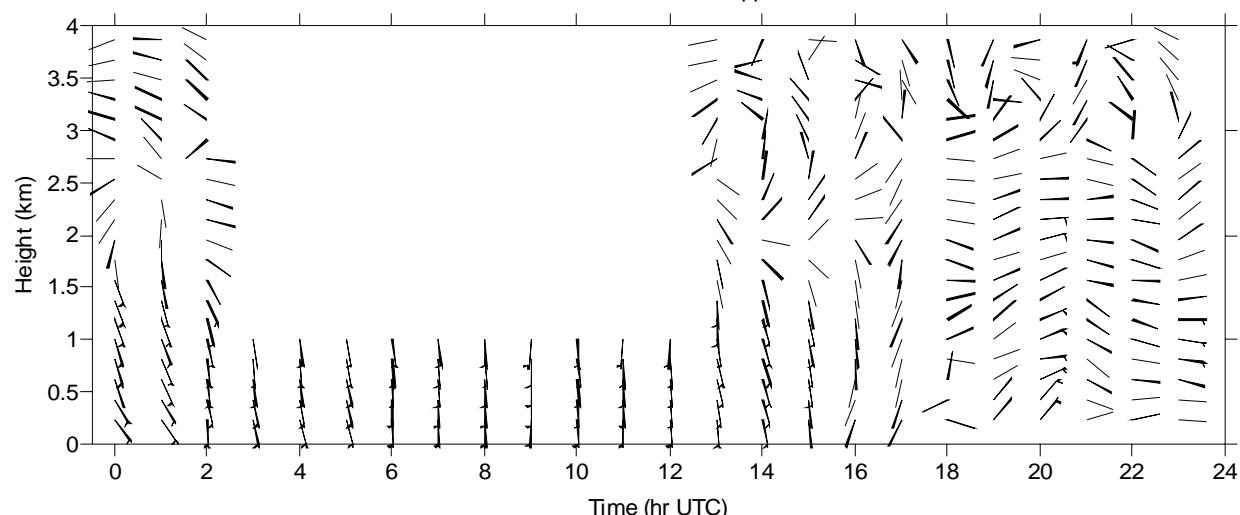
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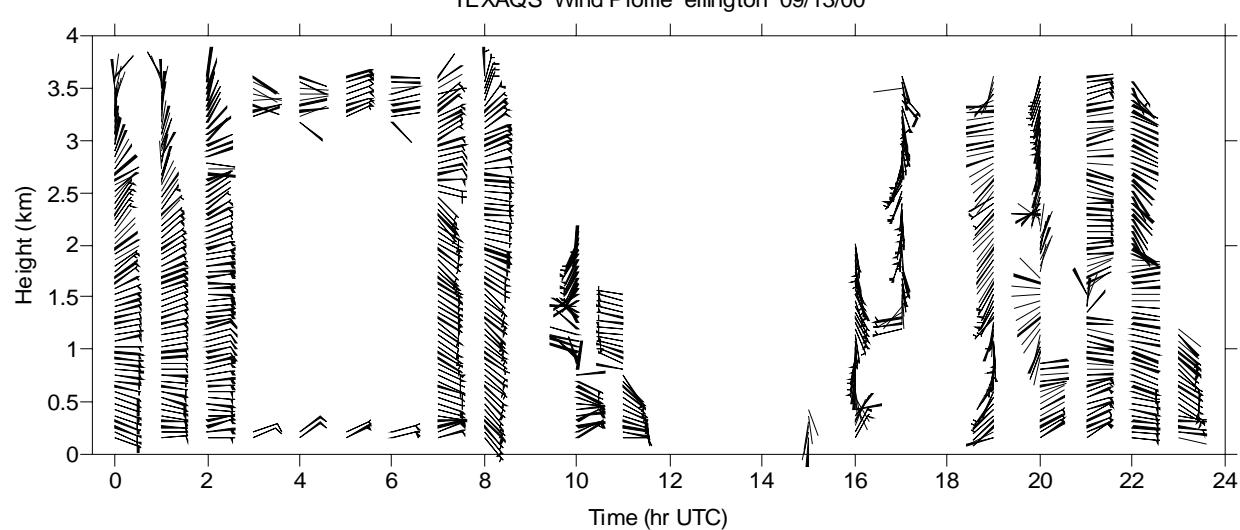
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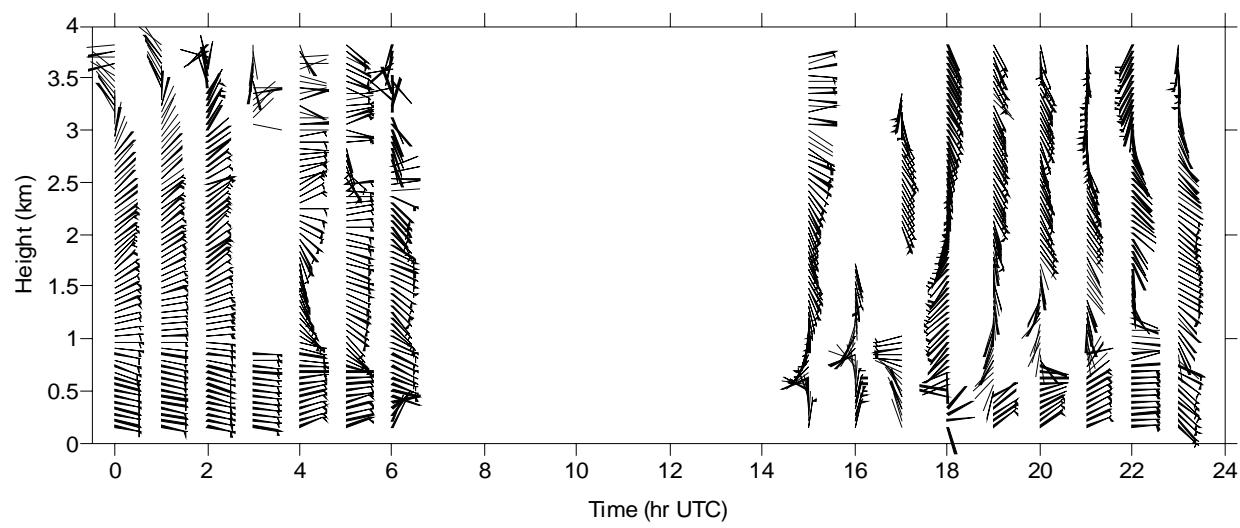
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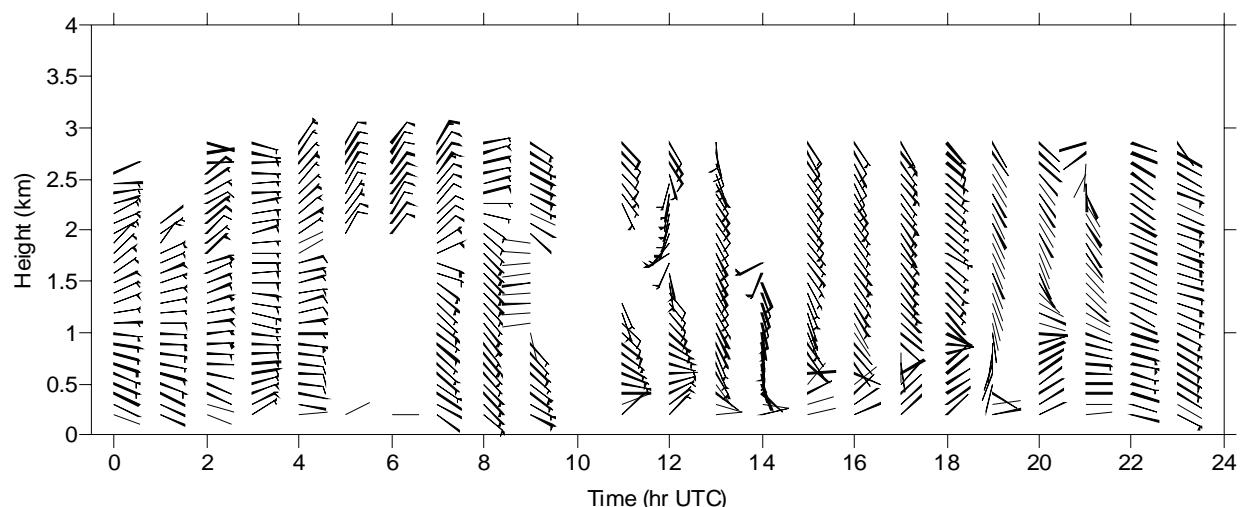
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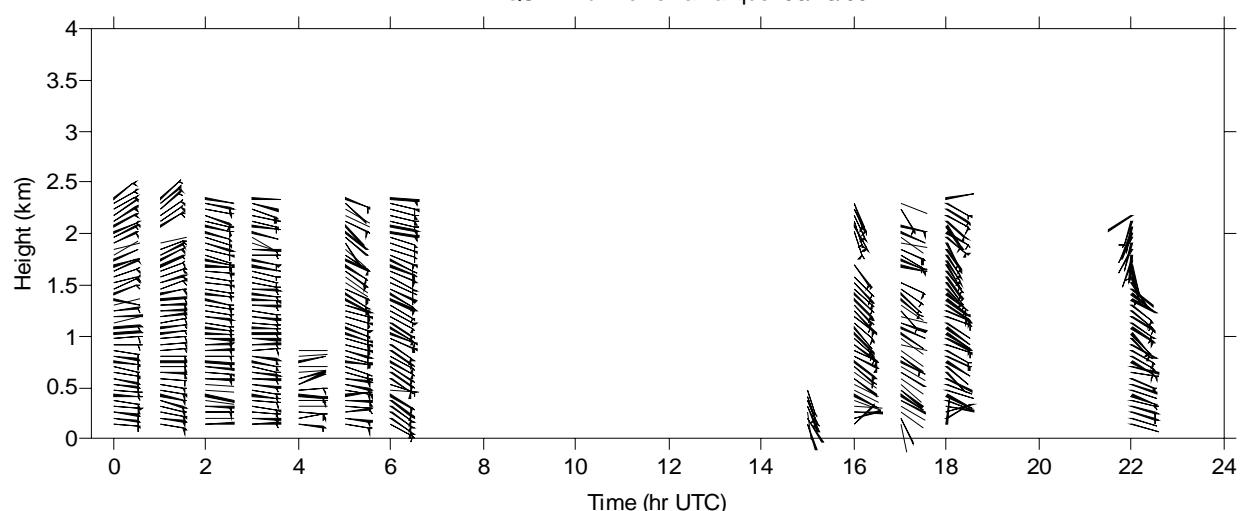
TEXAQS Wind Profile houston 09/13/00



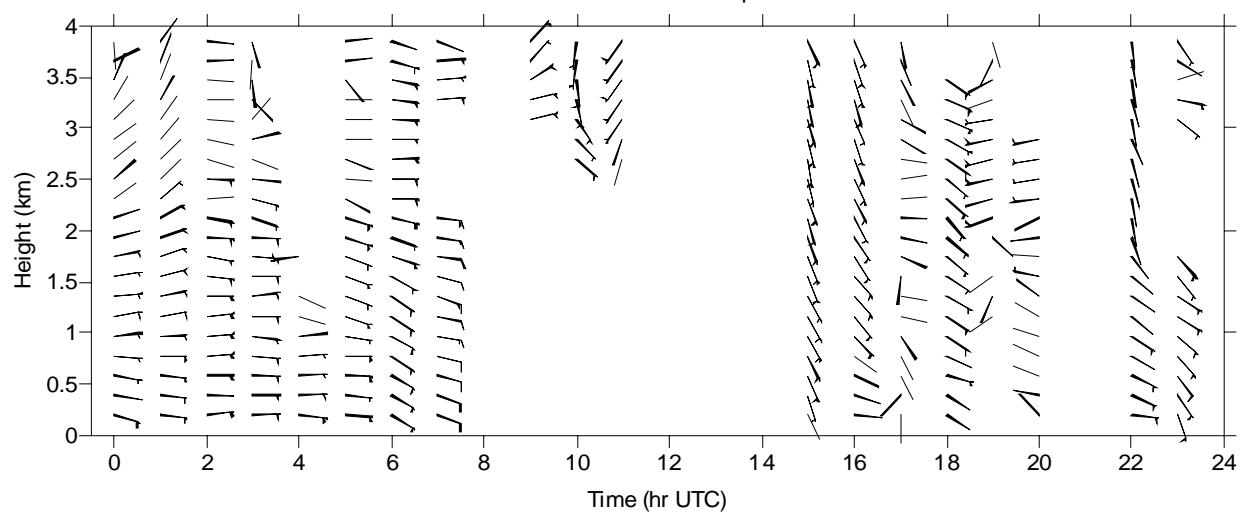
TEXAQS Wind Profile htn 09/13/00



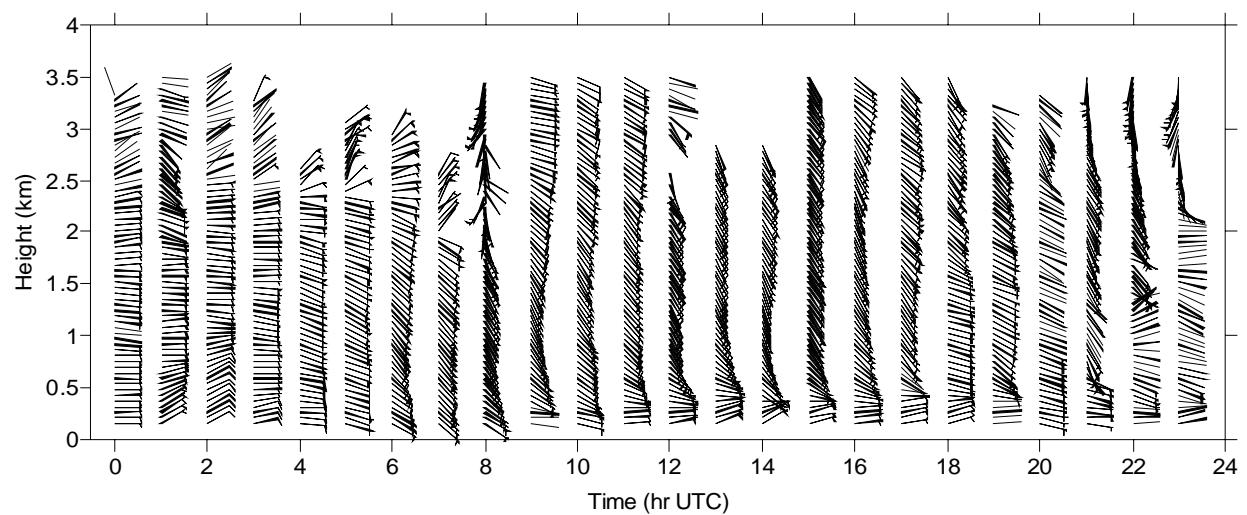
TEXAQS Wind Profile lamarque 09/13/00



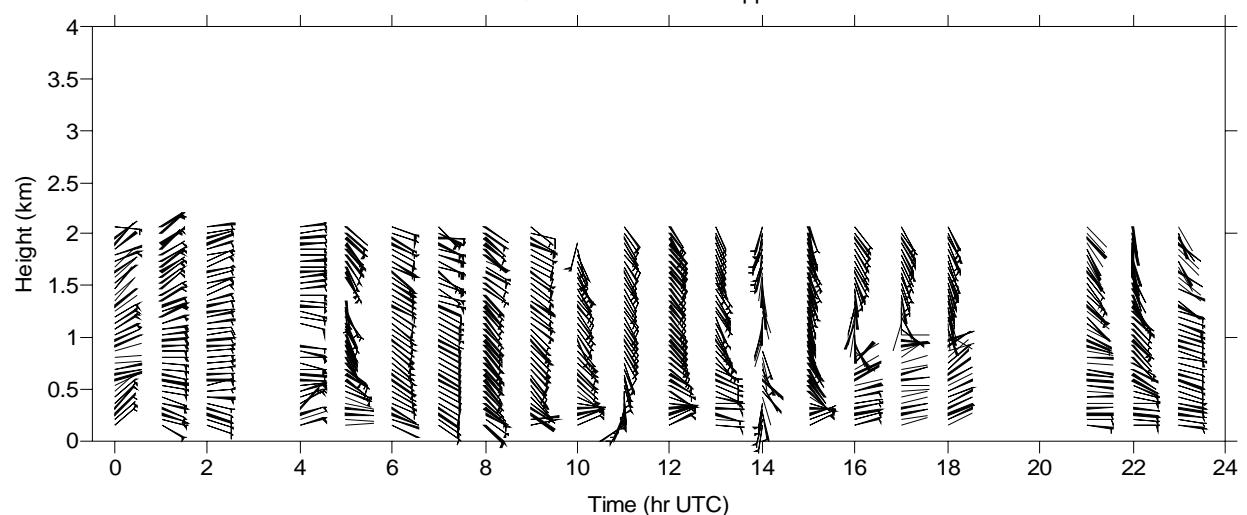
TEXAQS Wind Profile lamarque 09/13/00



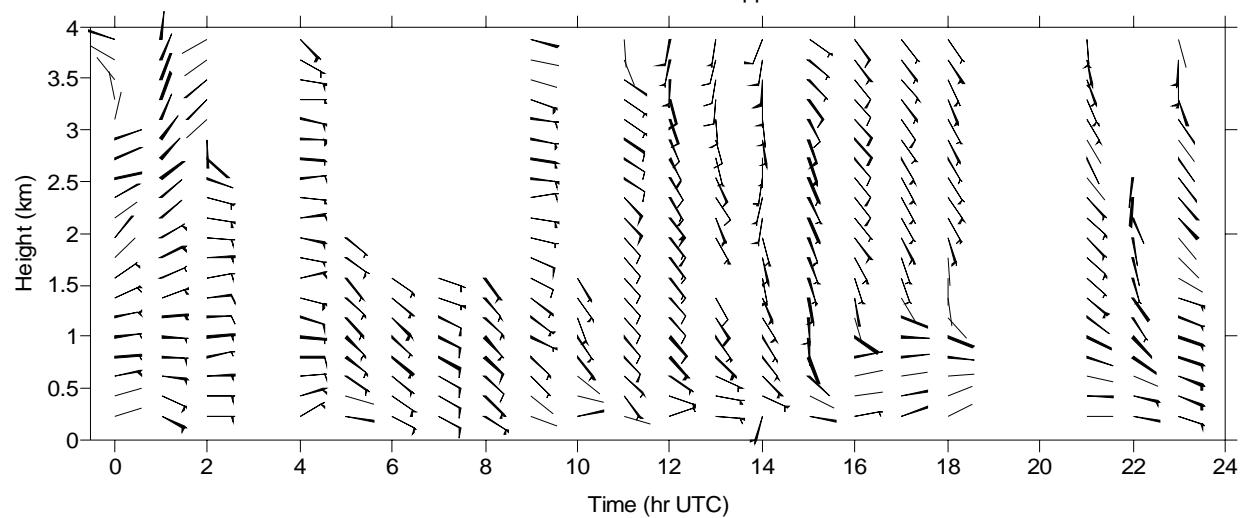
TEXAQS Wind Profile lma 09/13/00



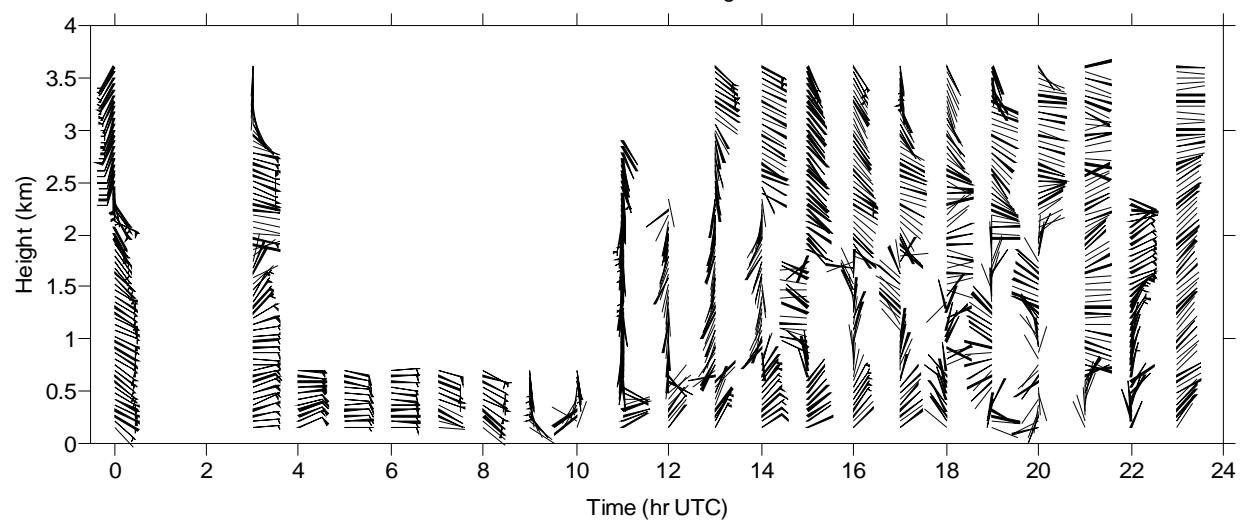
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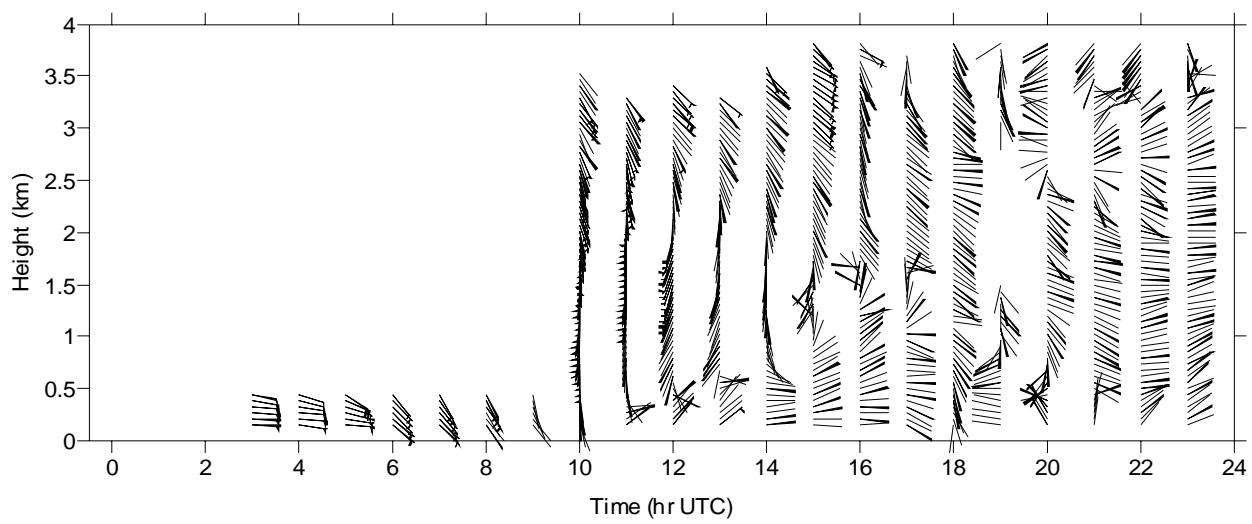
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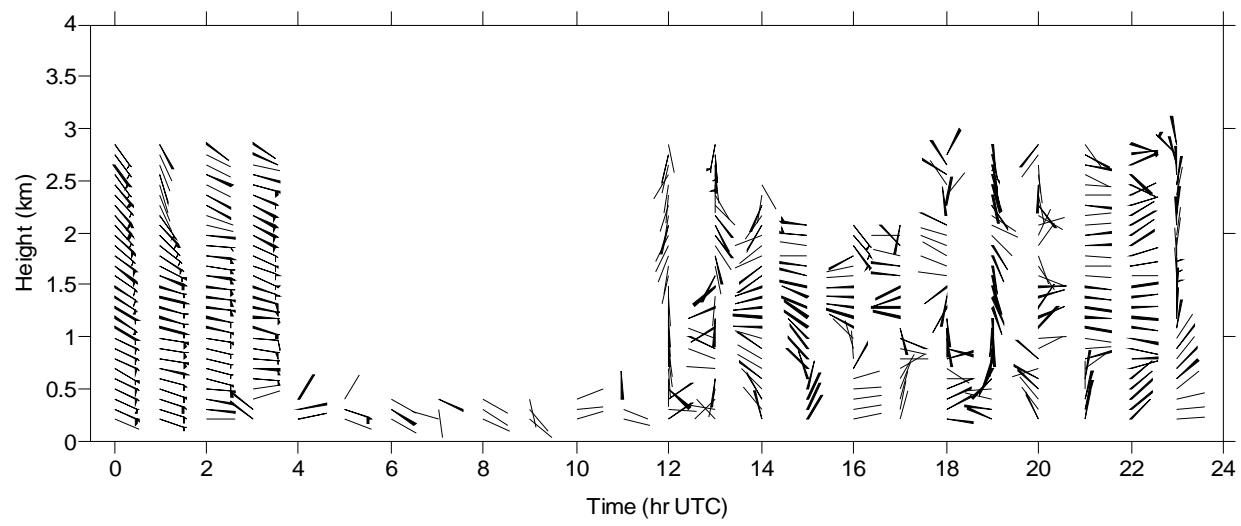
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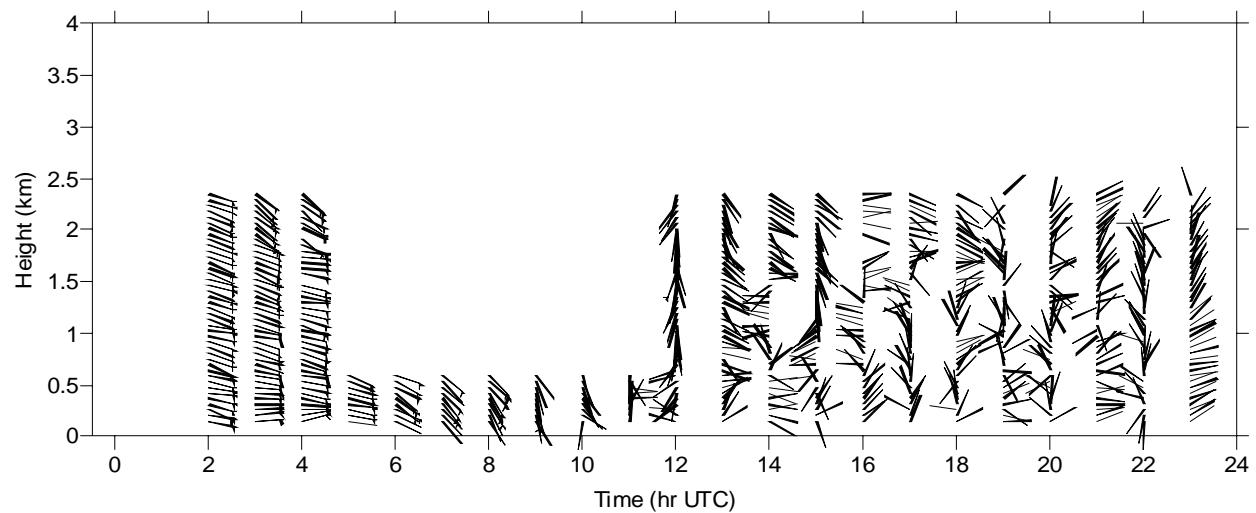
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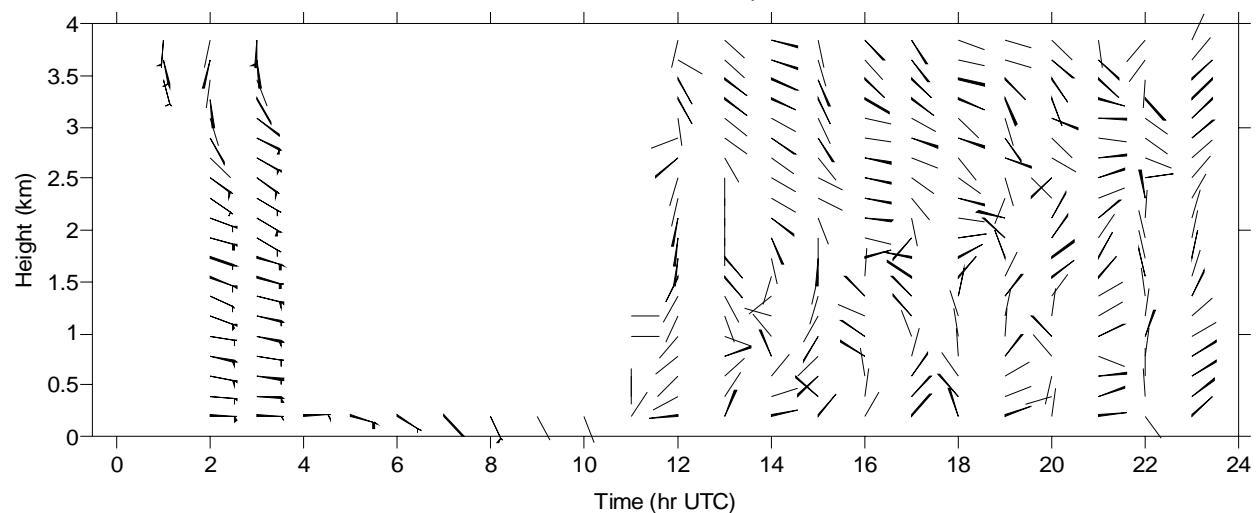
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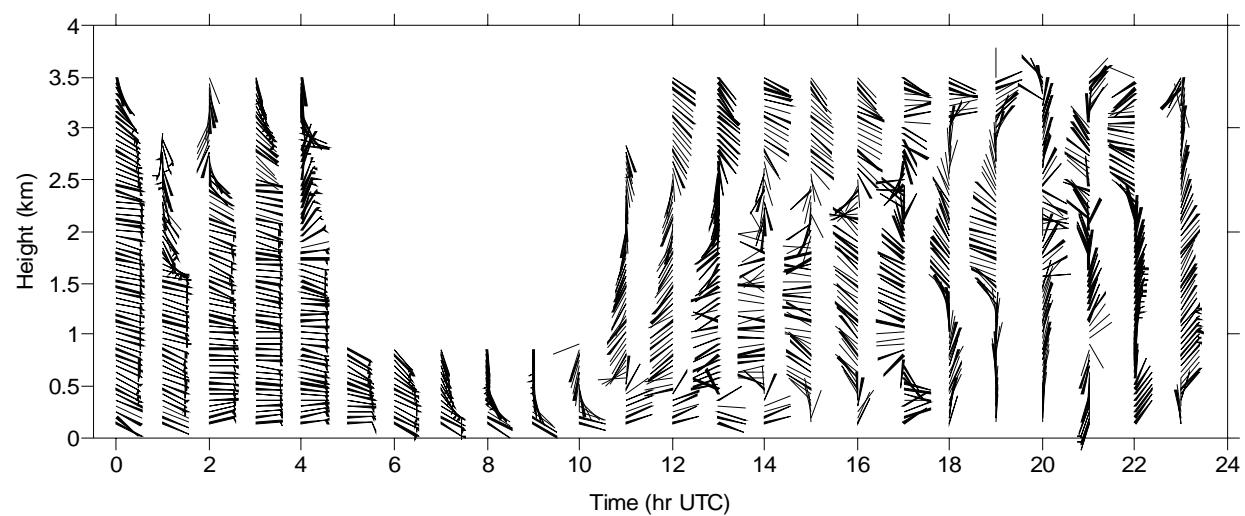
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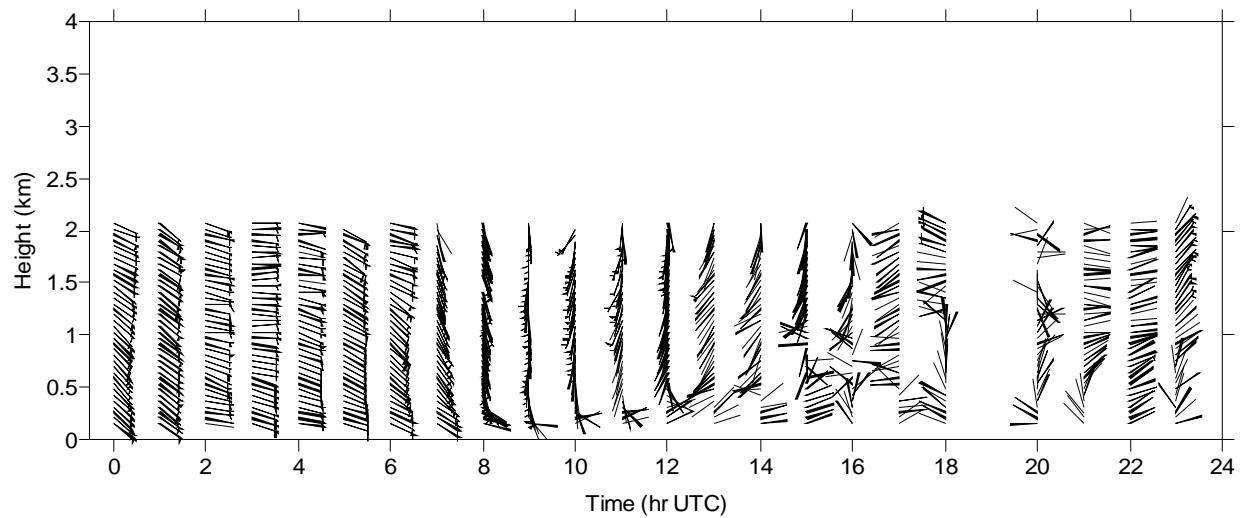
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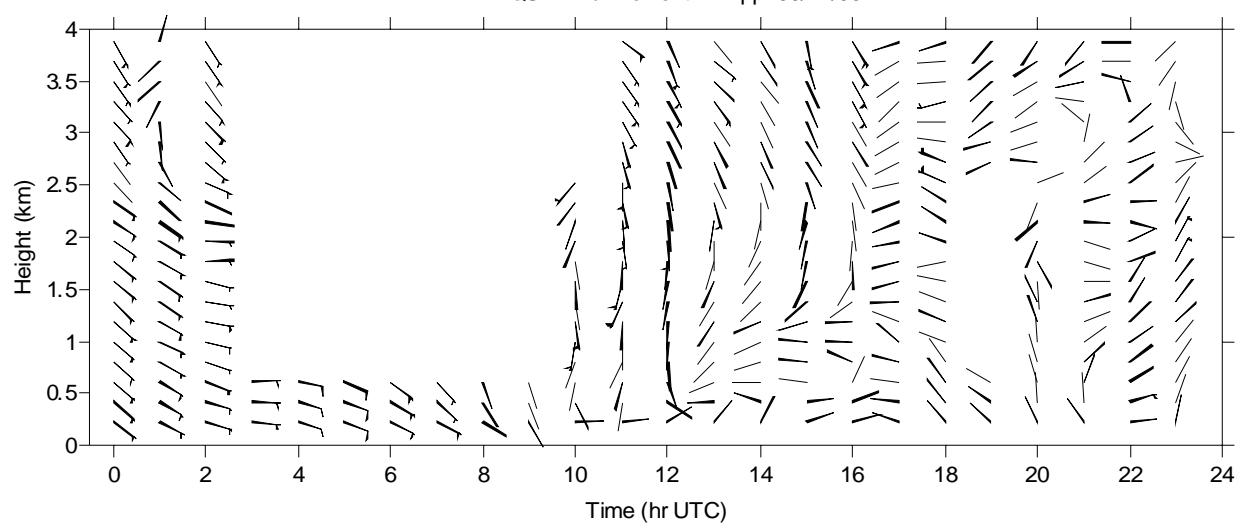
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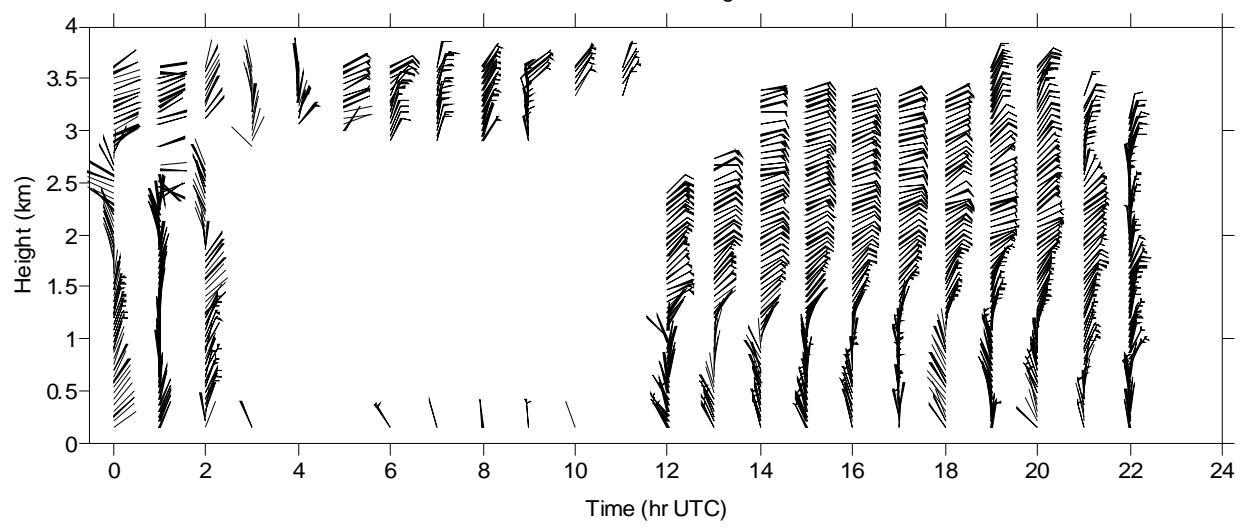
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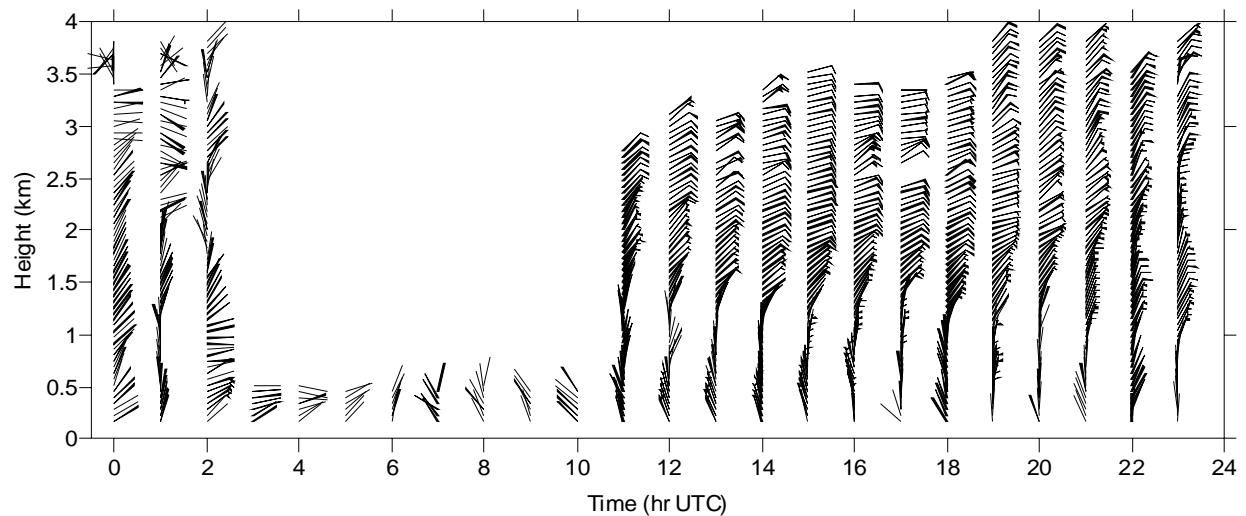
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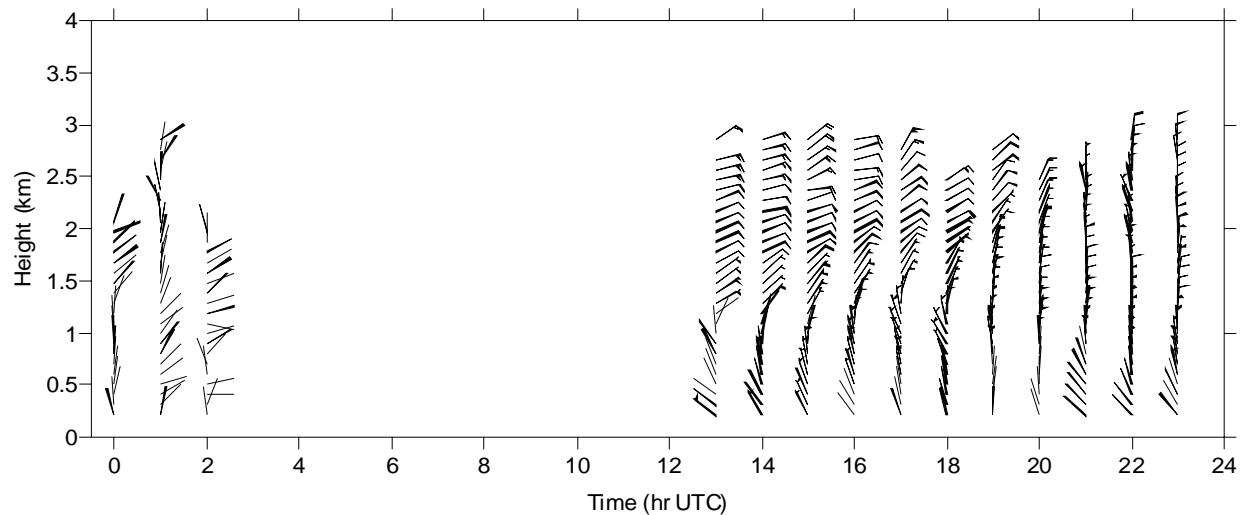
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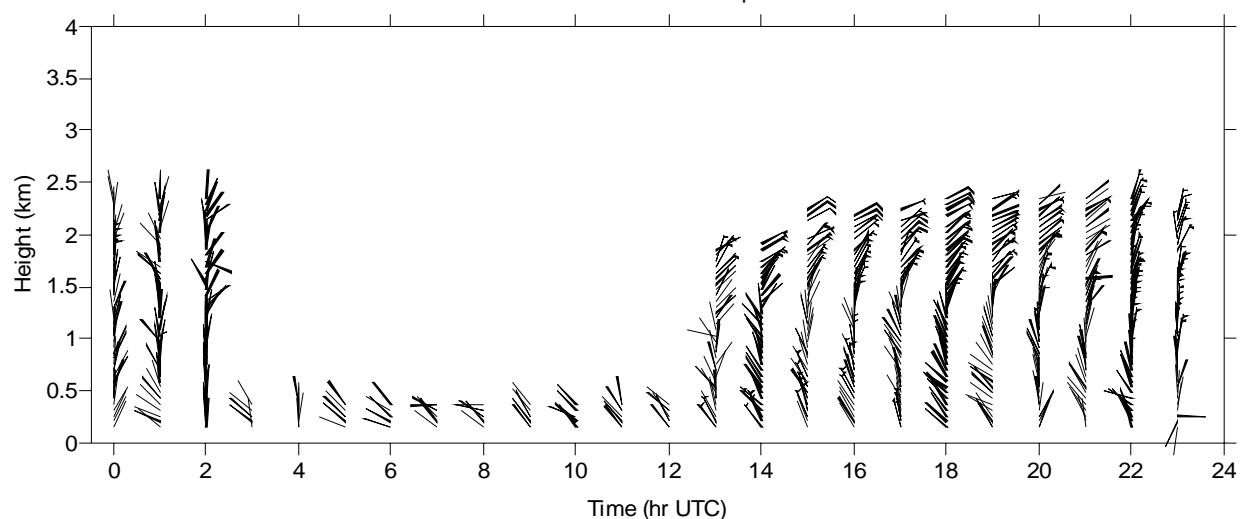
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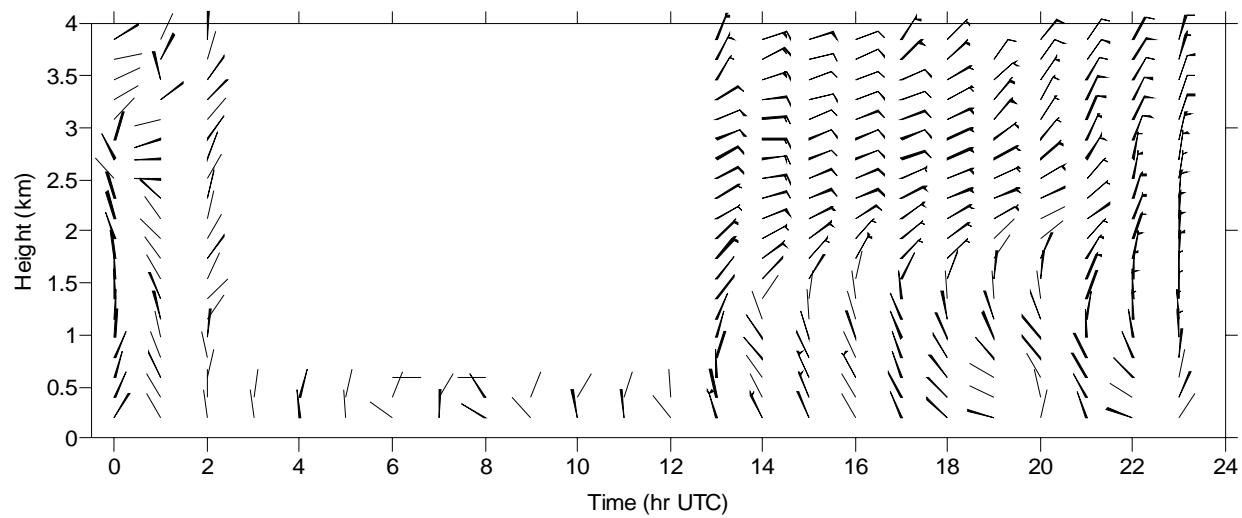
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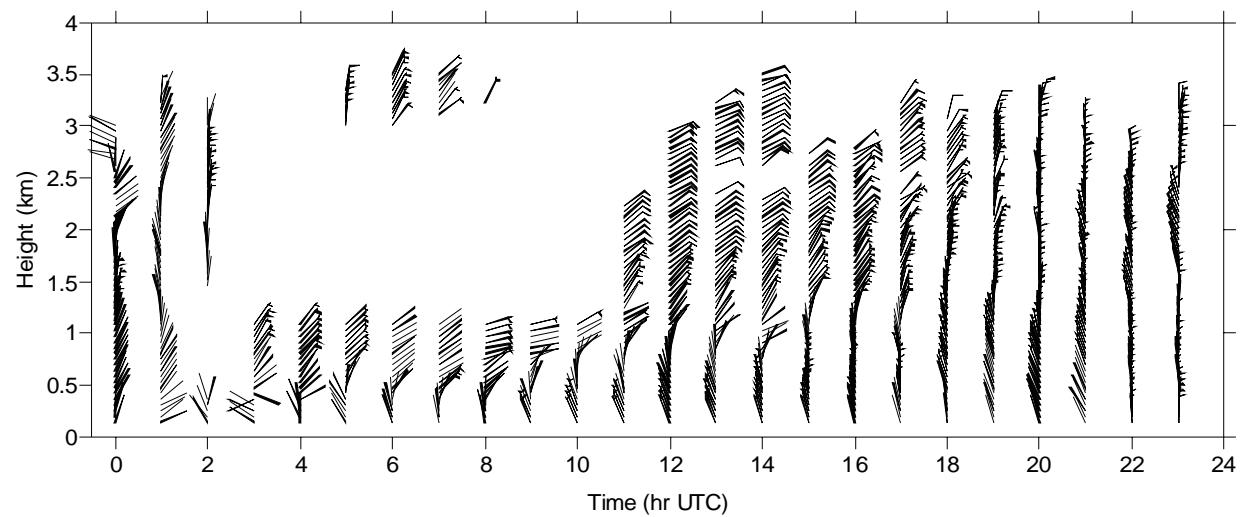
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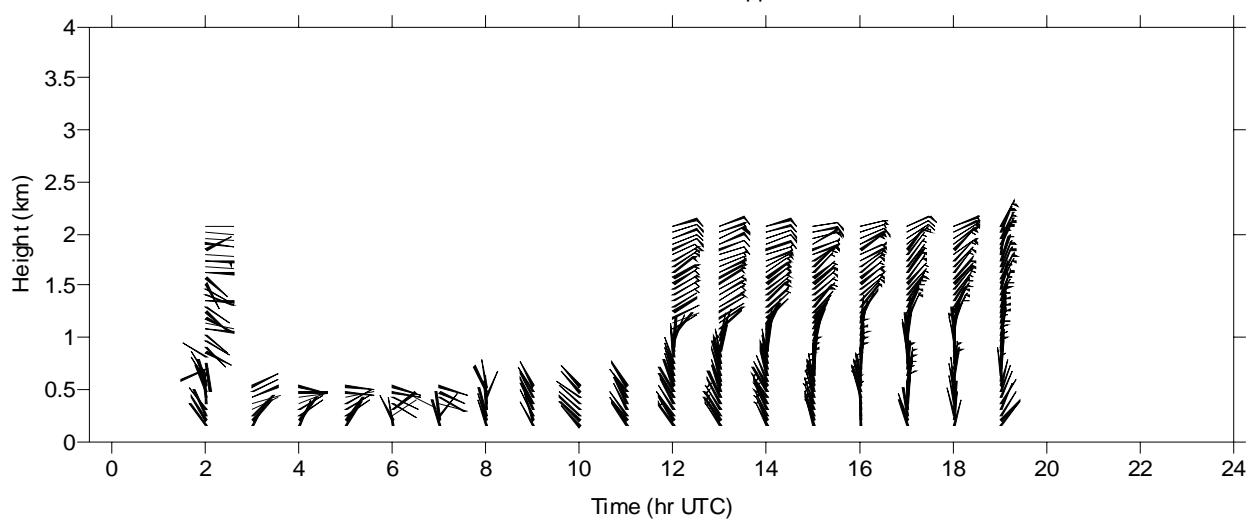
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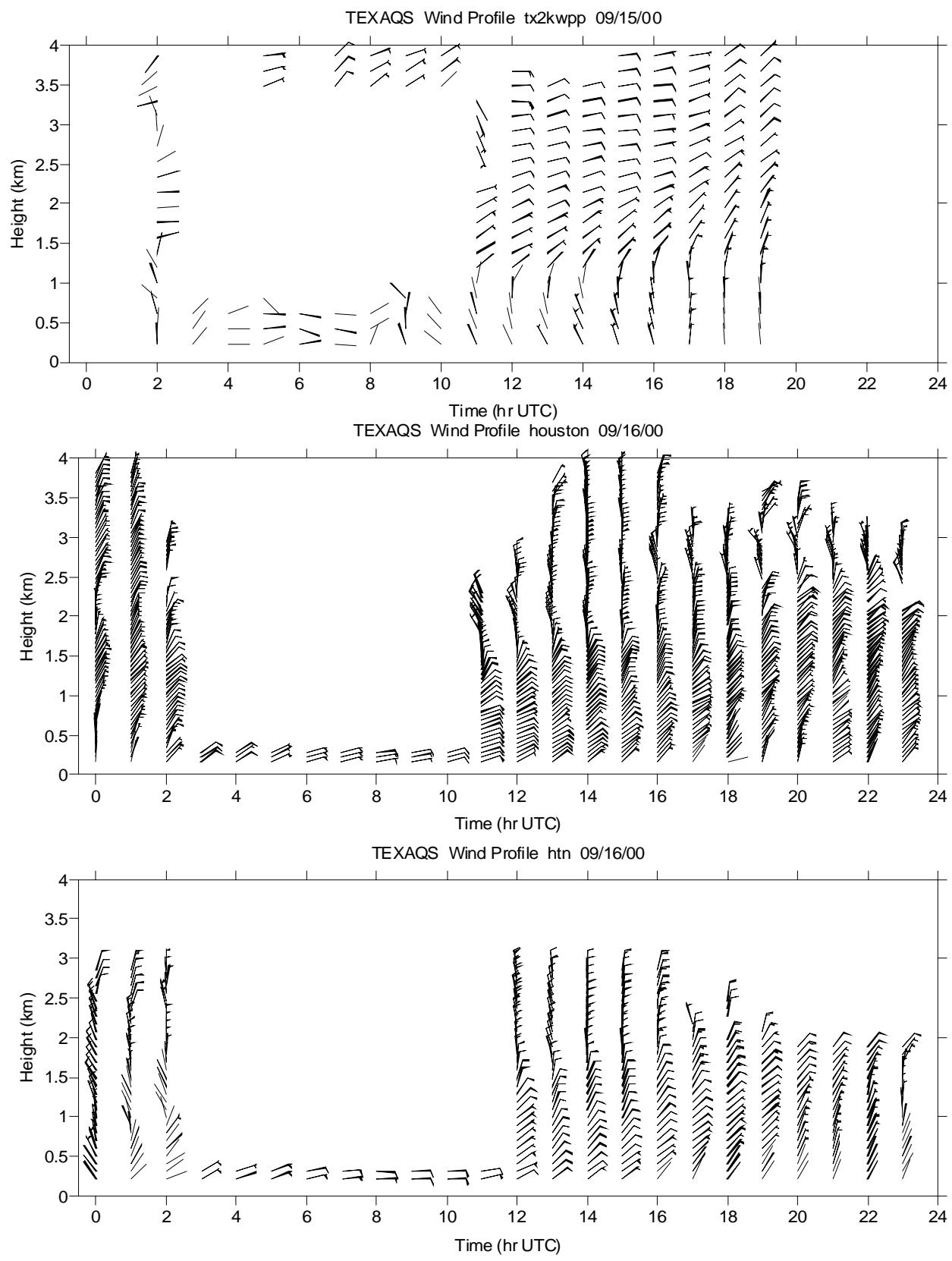


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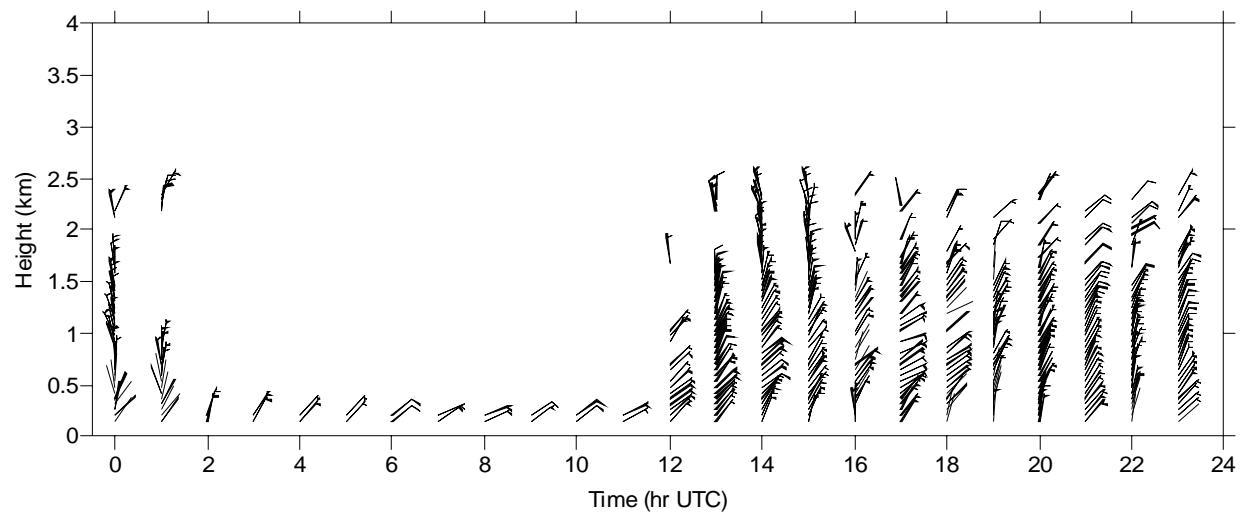


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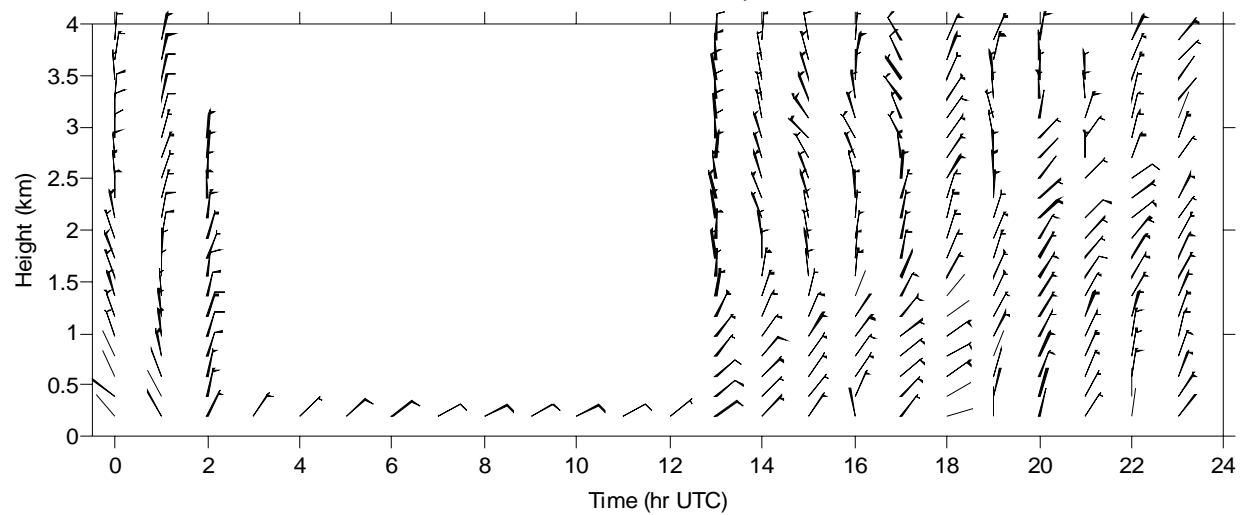




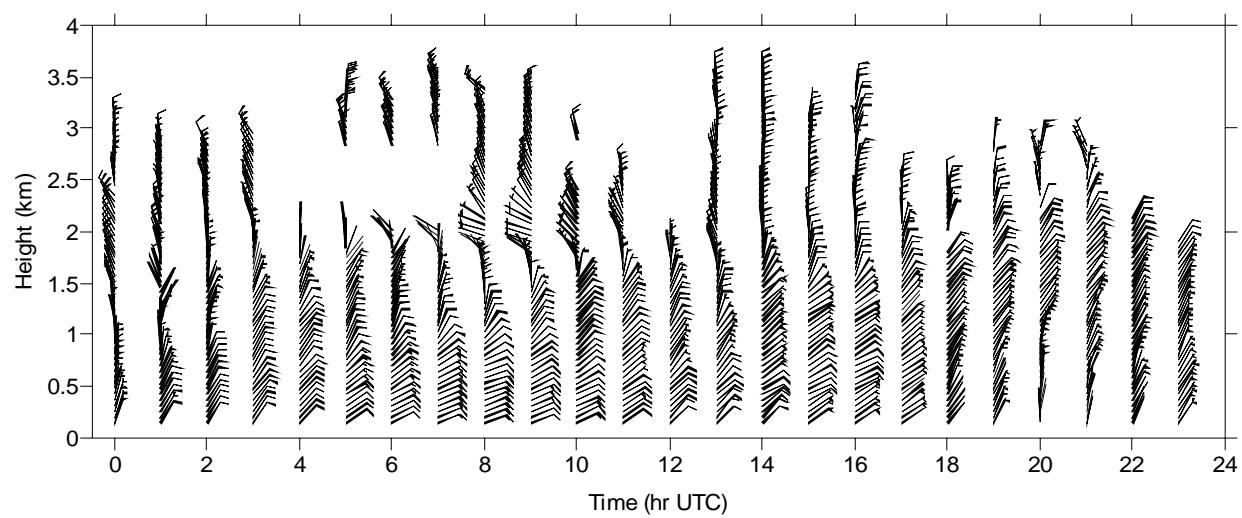
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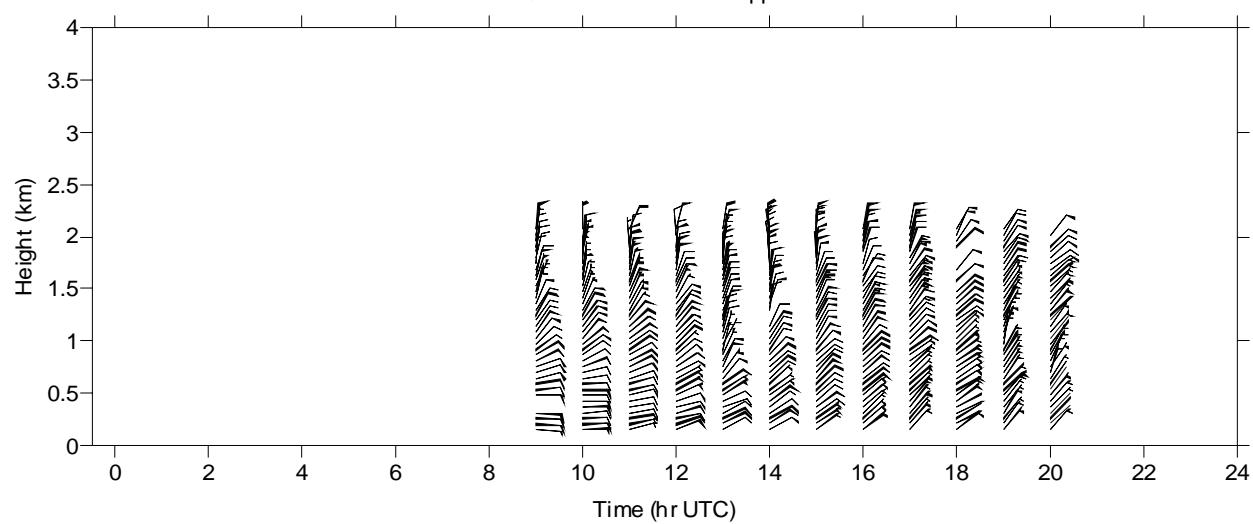
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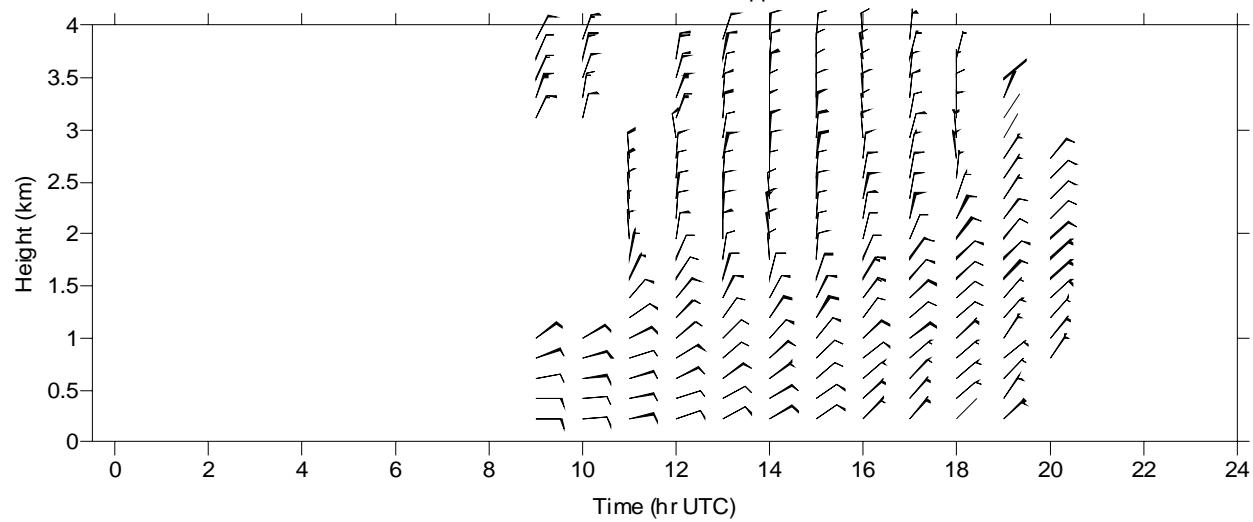
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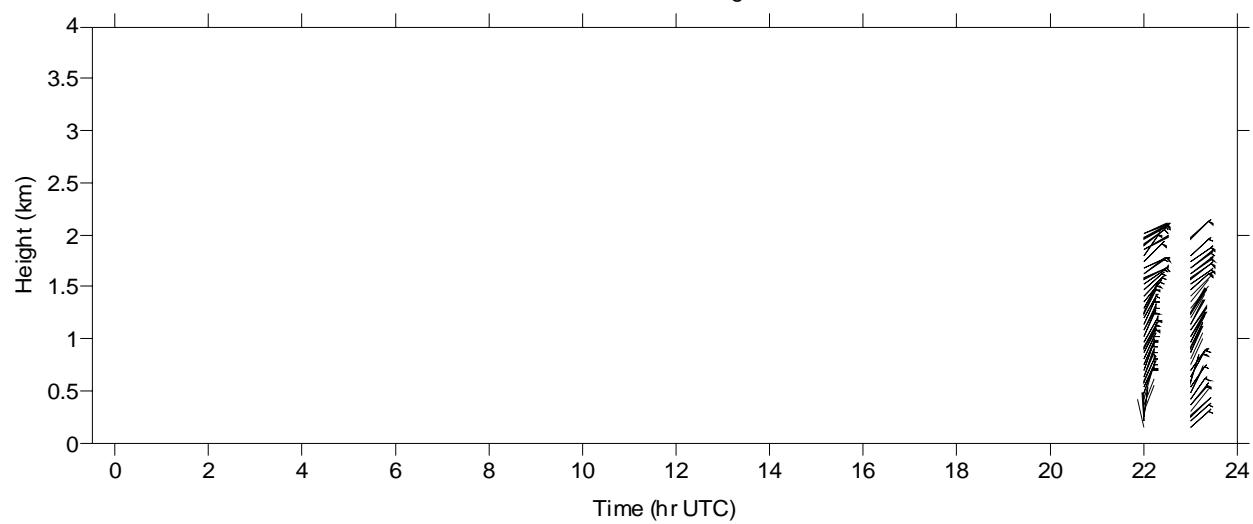
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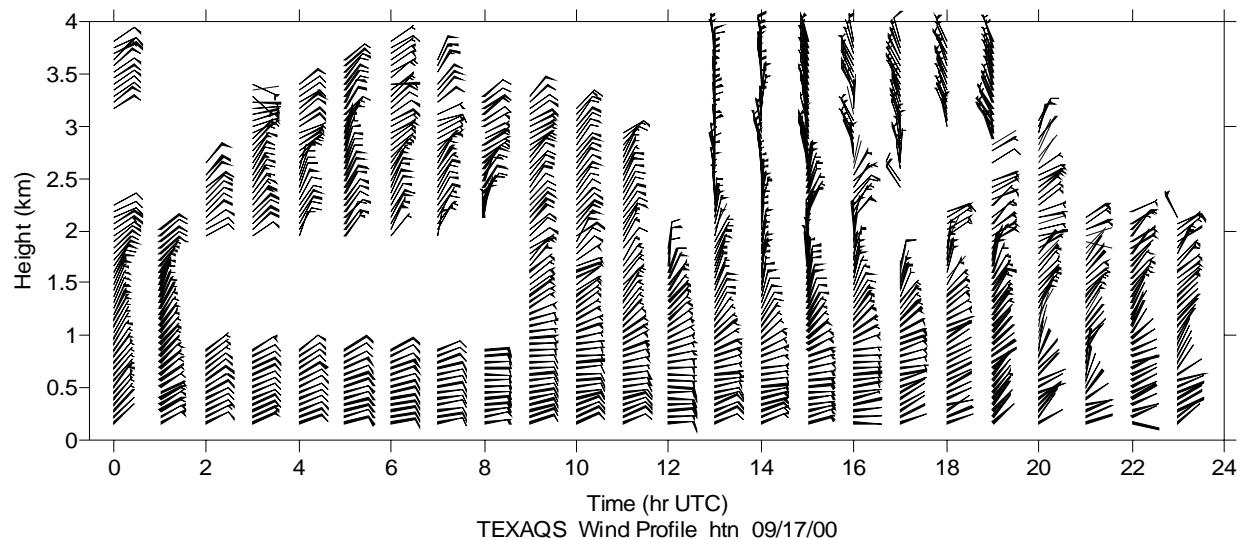
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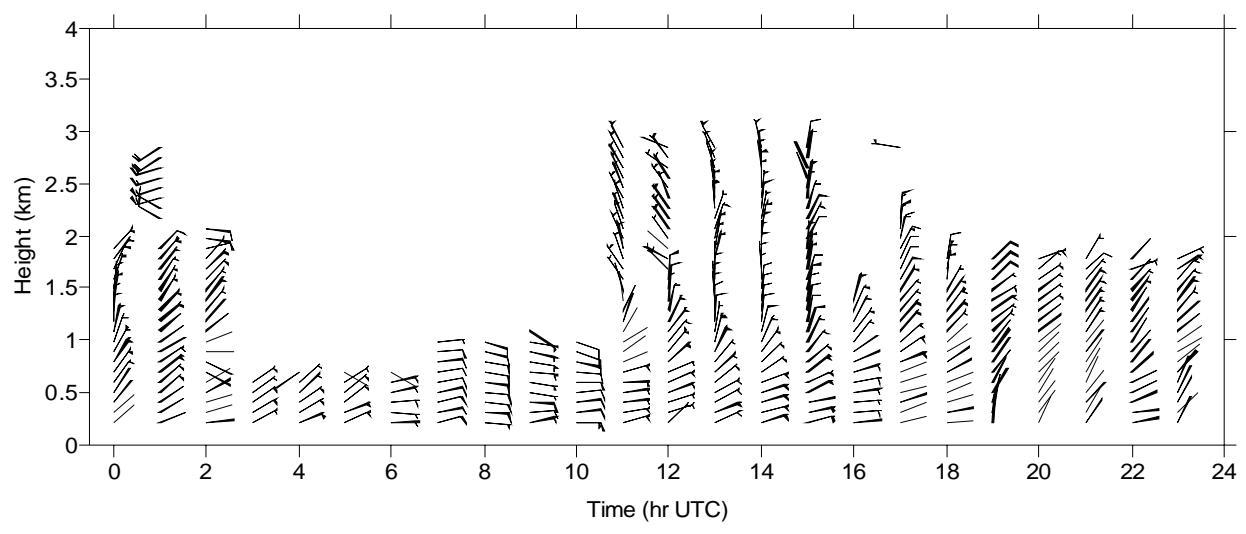
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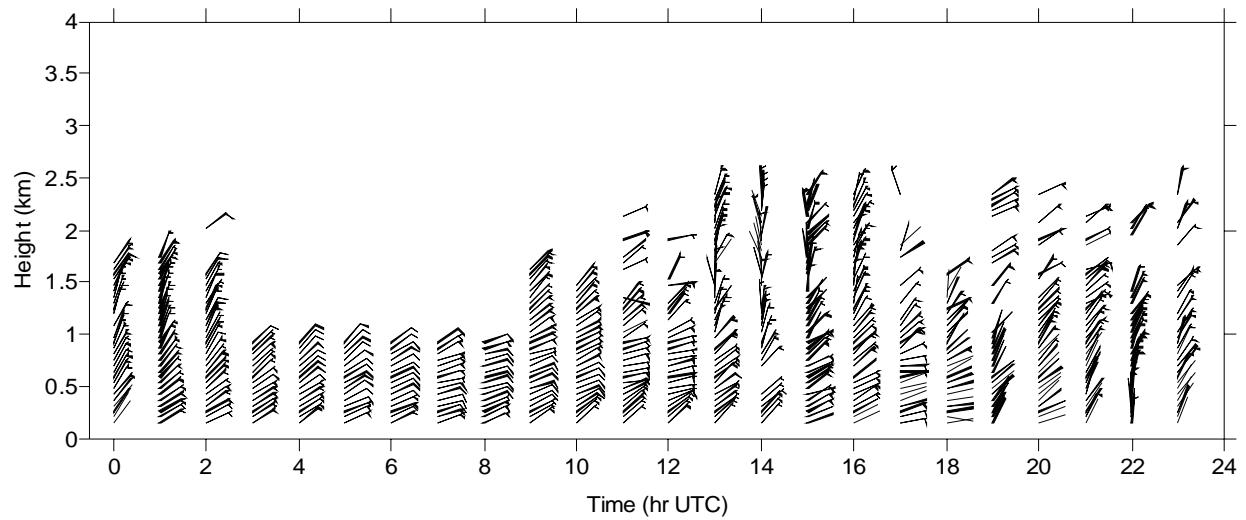
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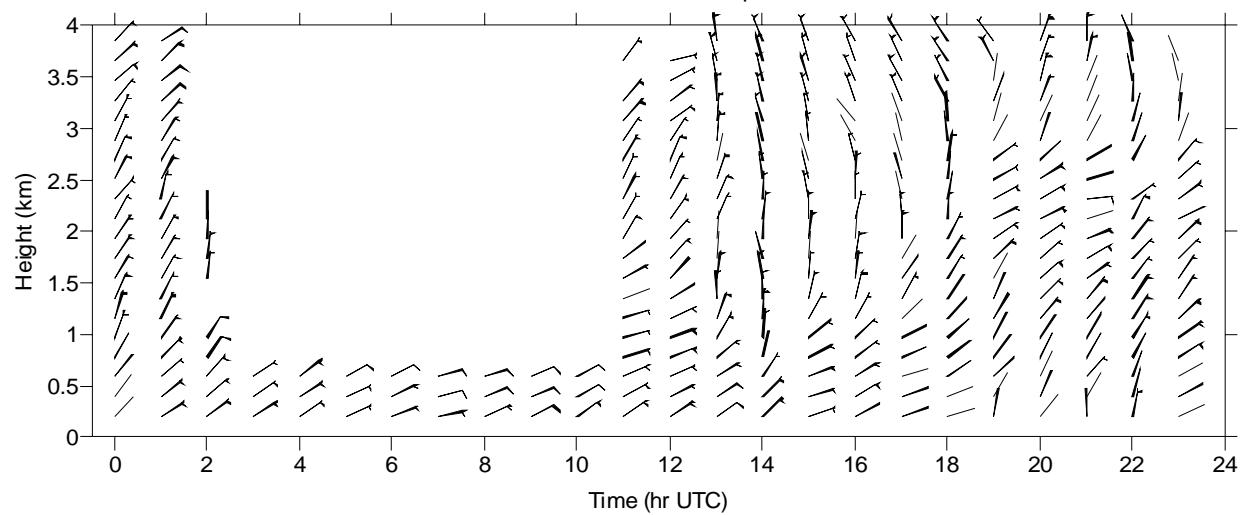
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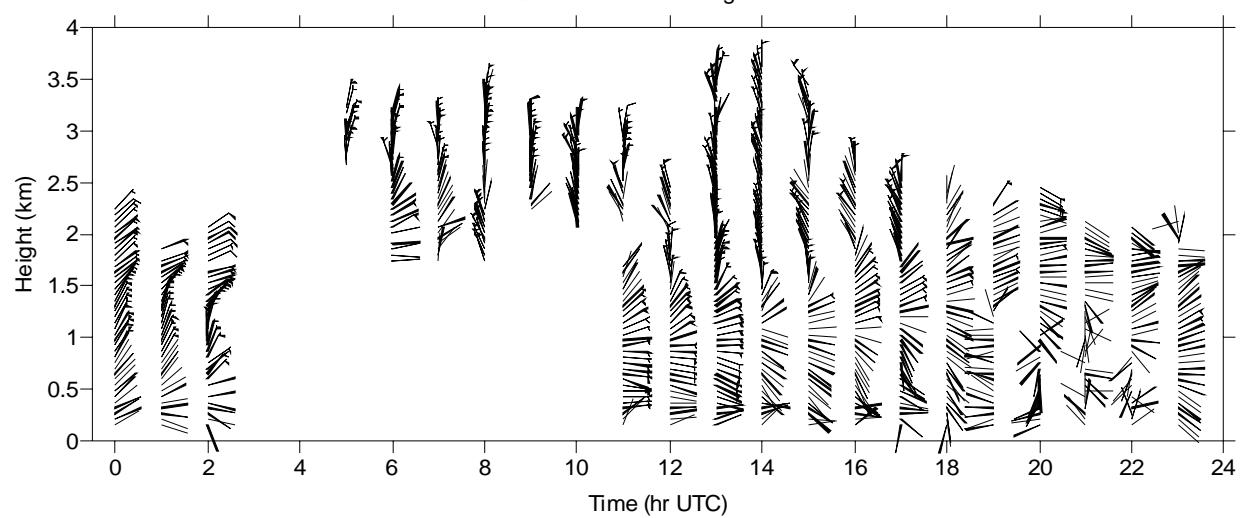
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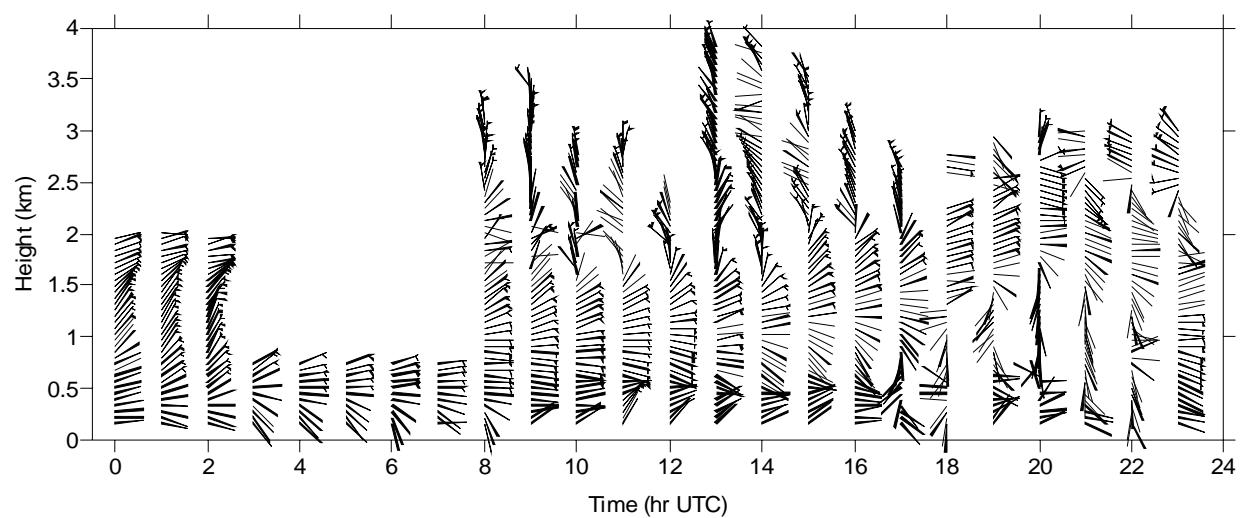
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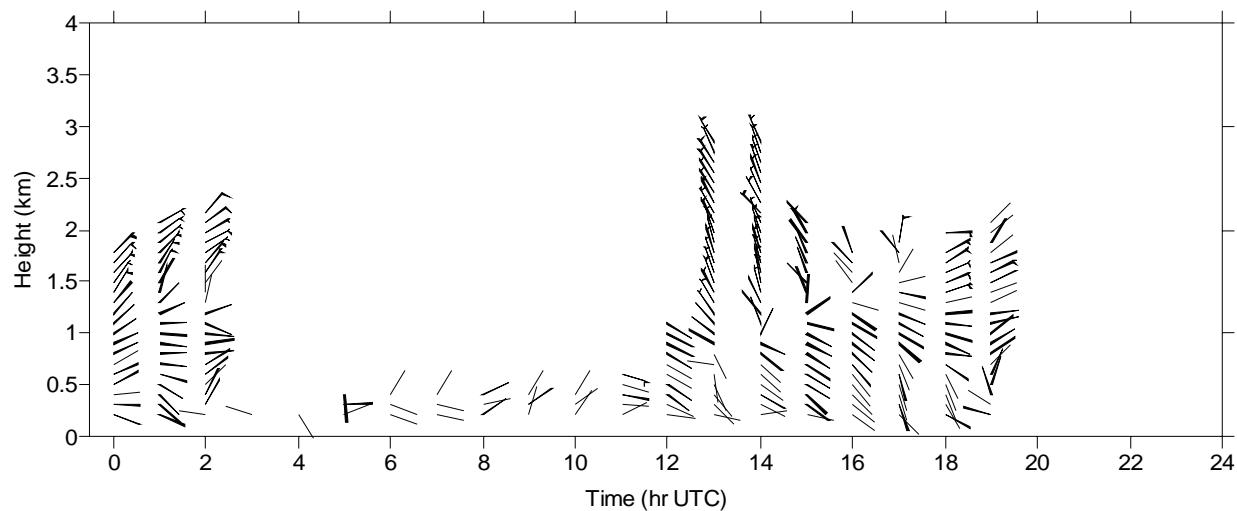
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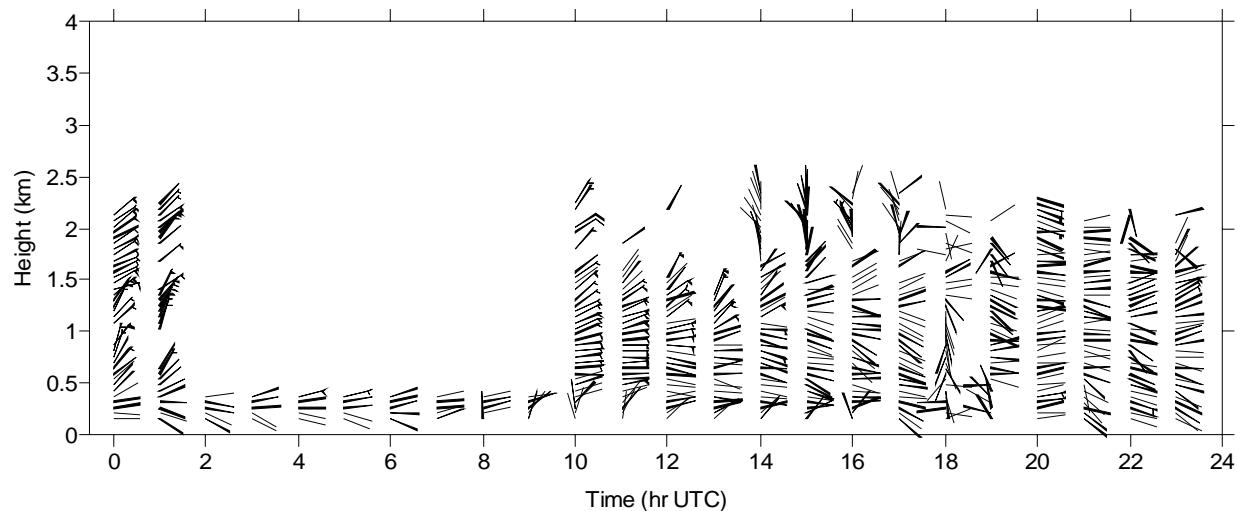
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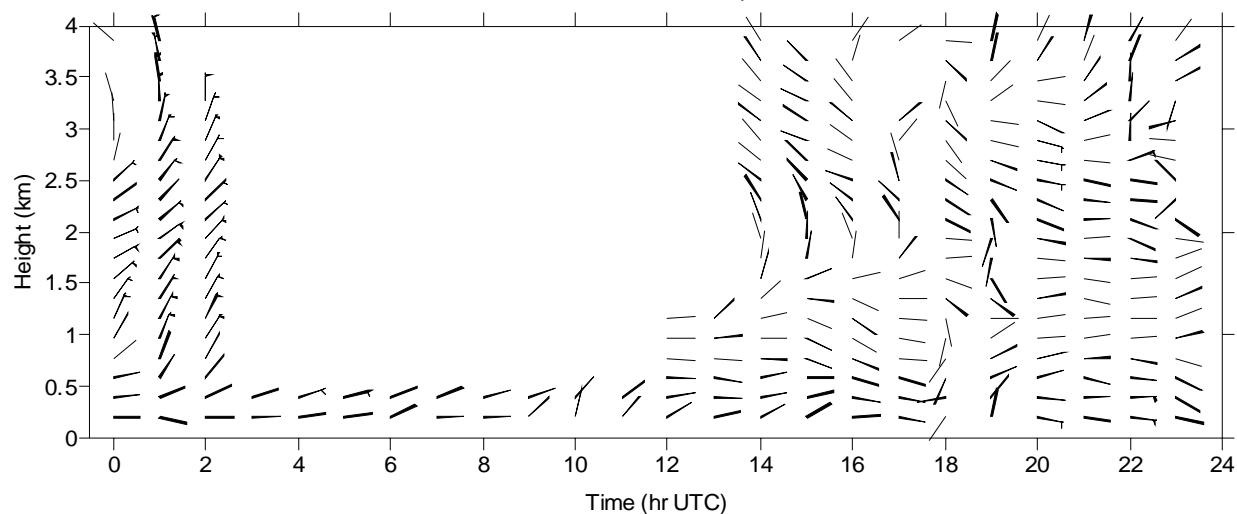
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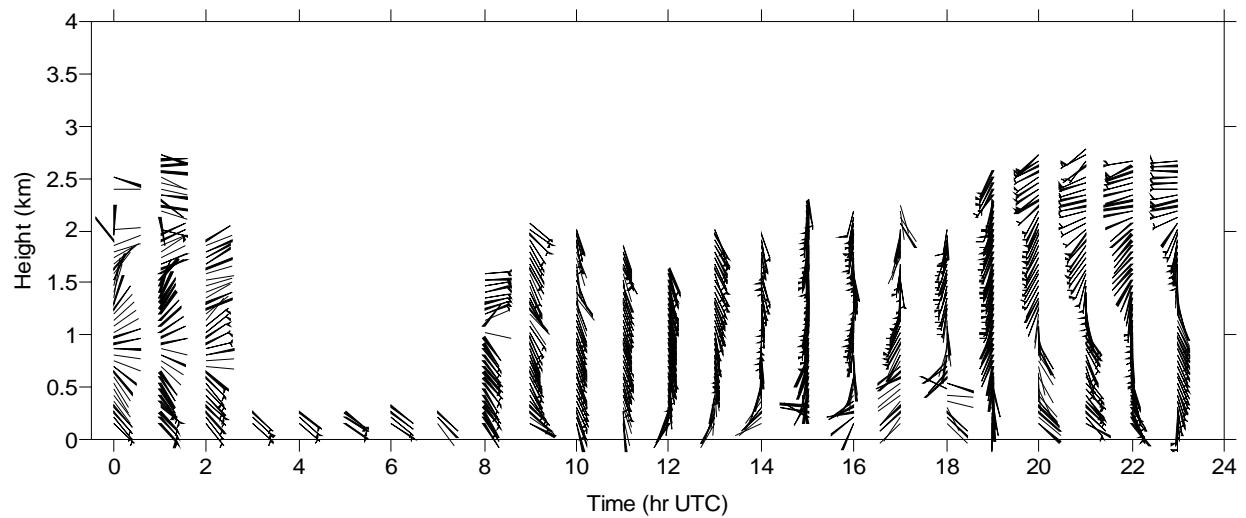
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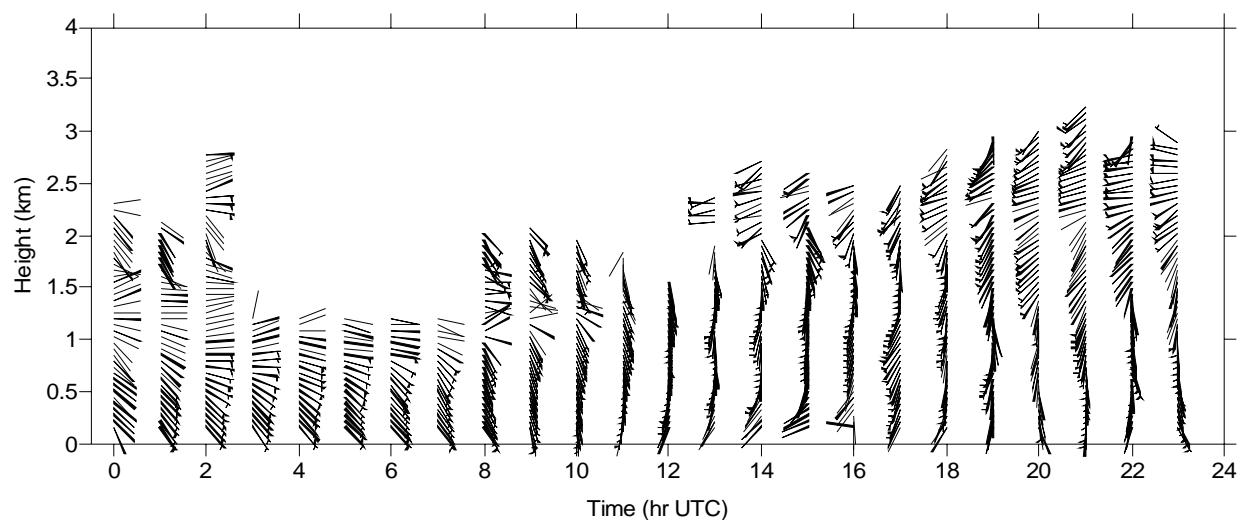
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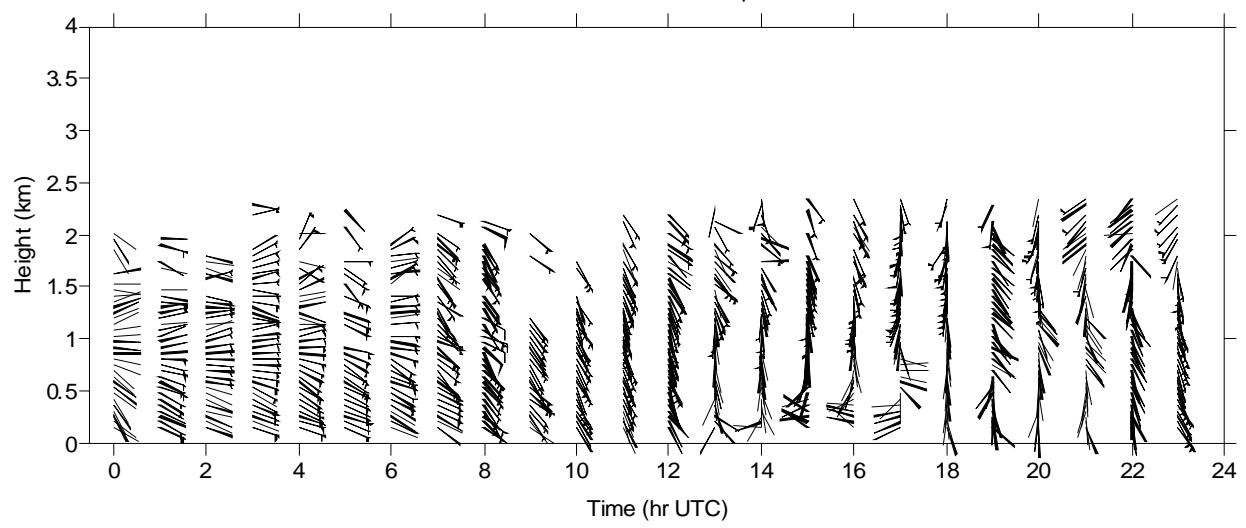
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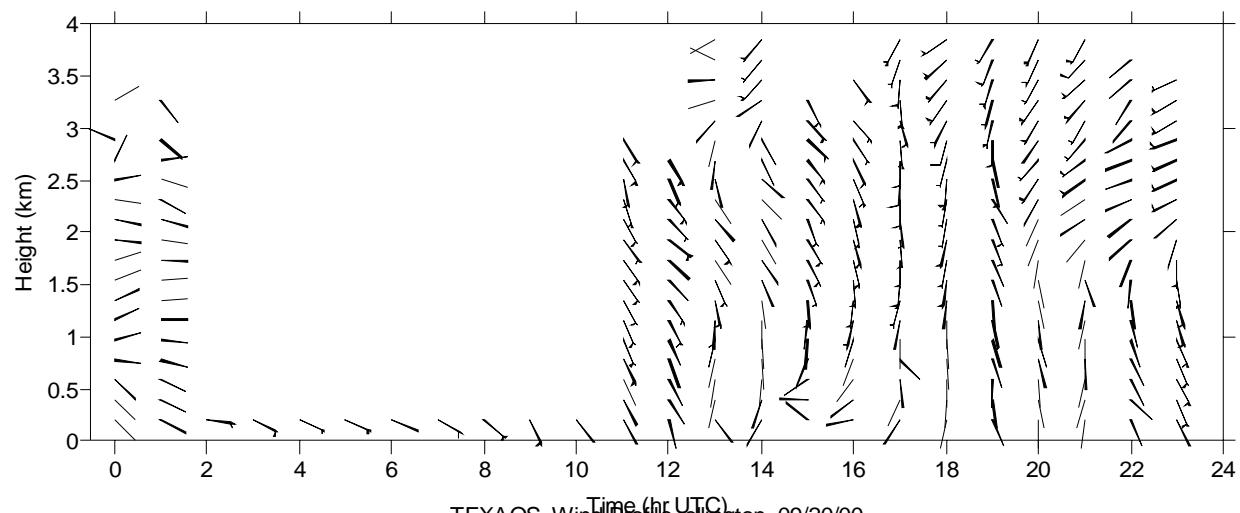
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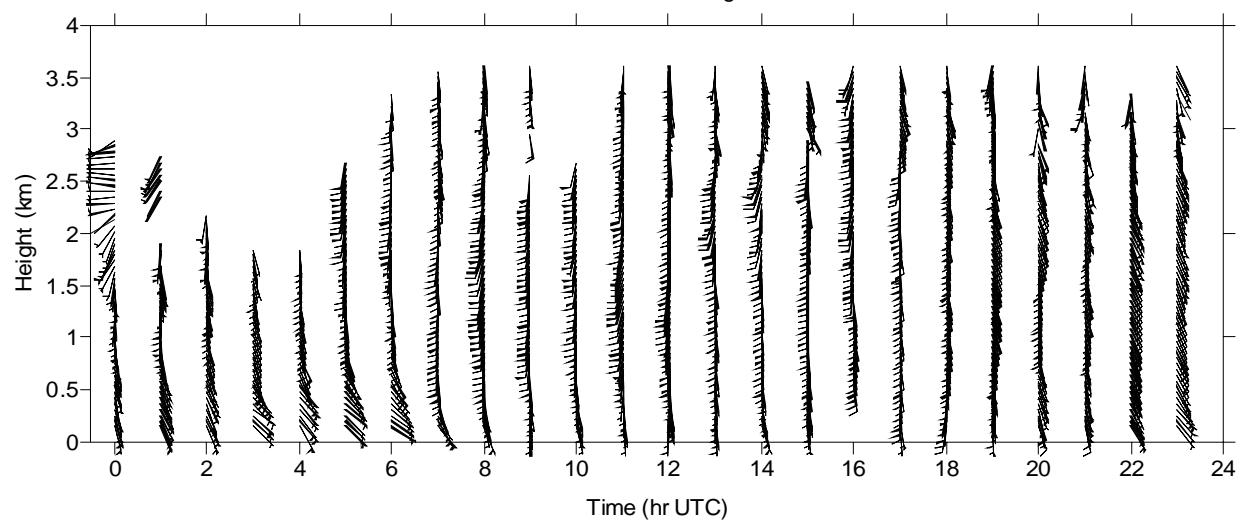
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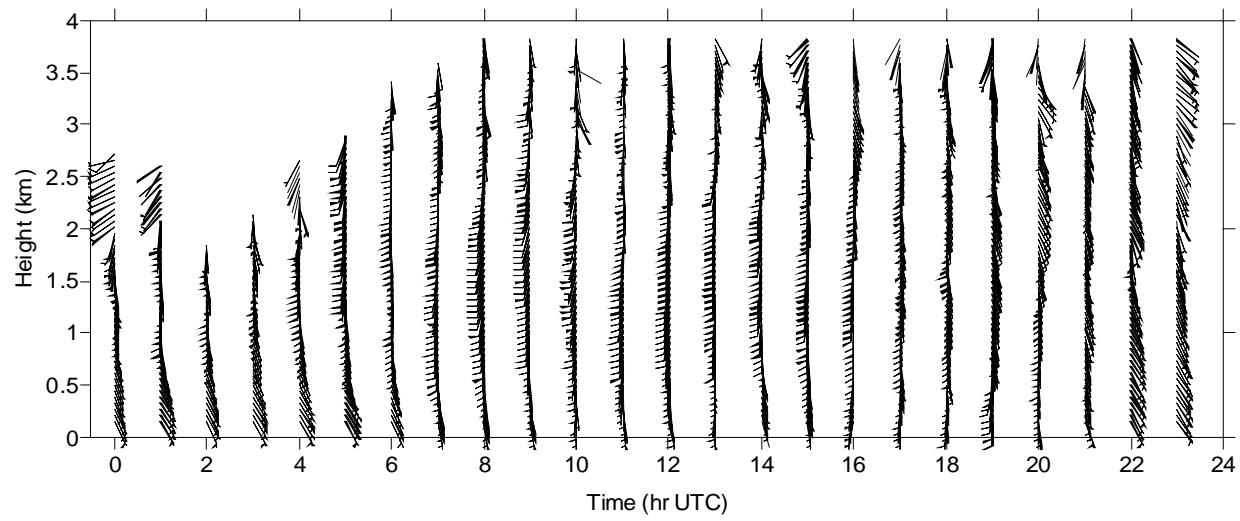
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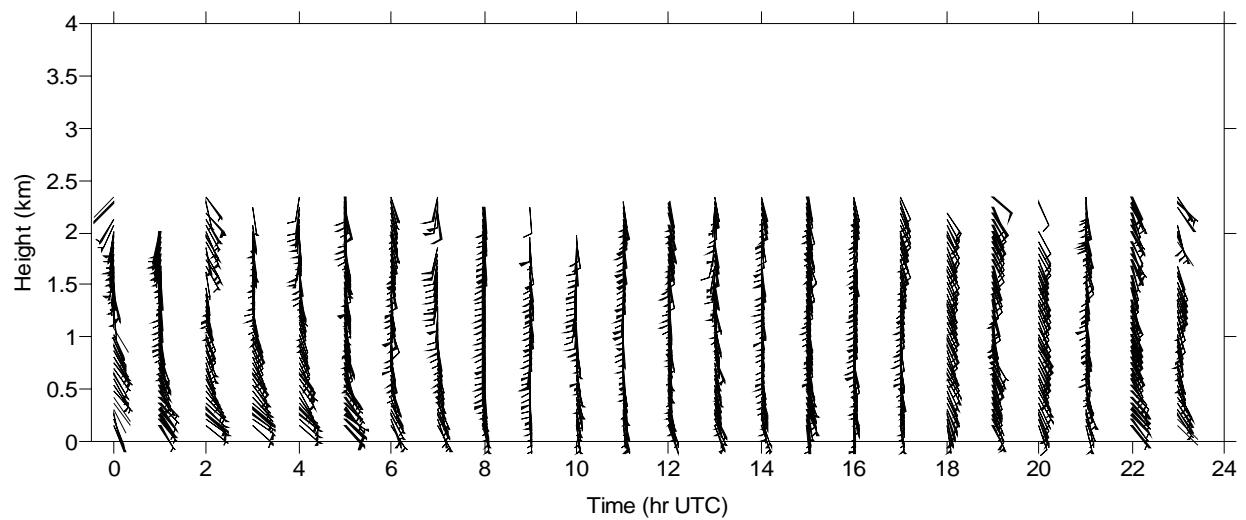
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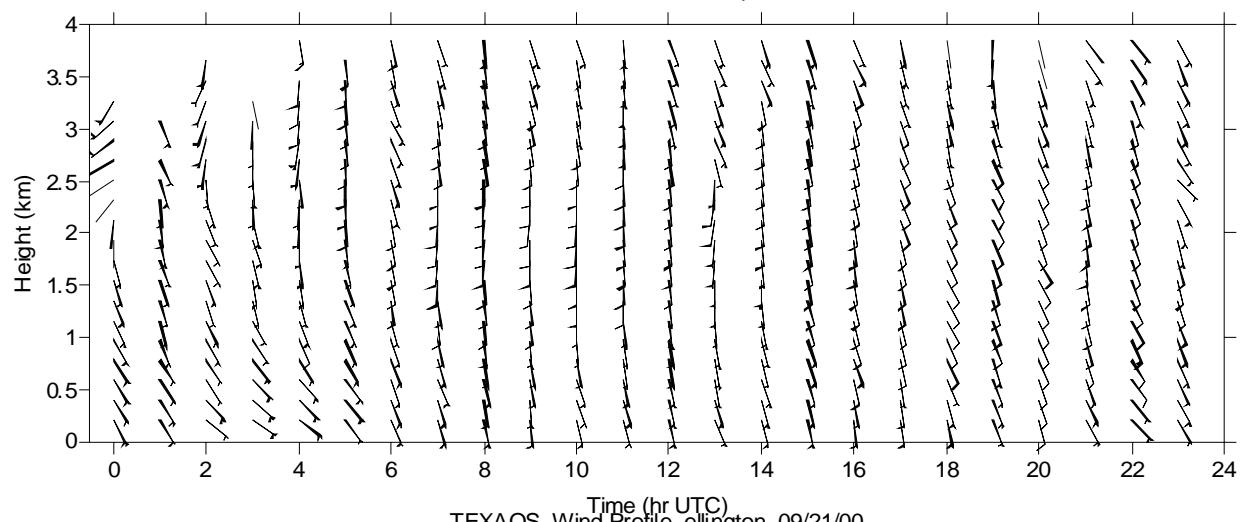
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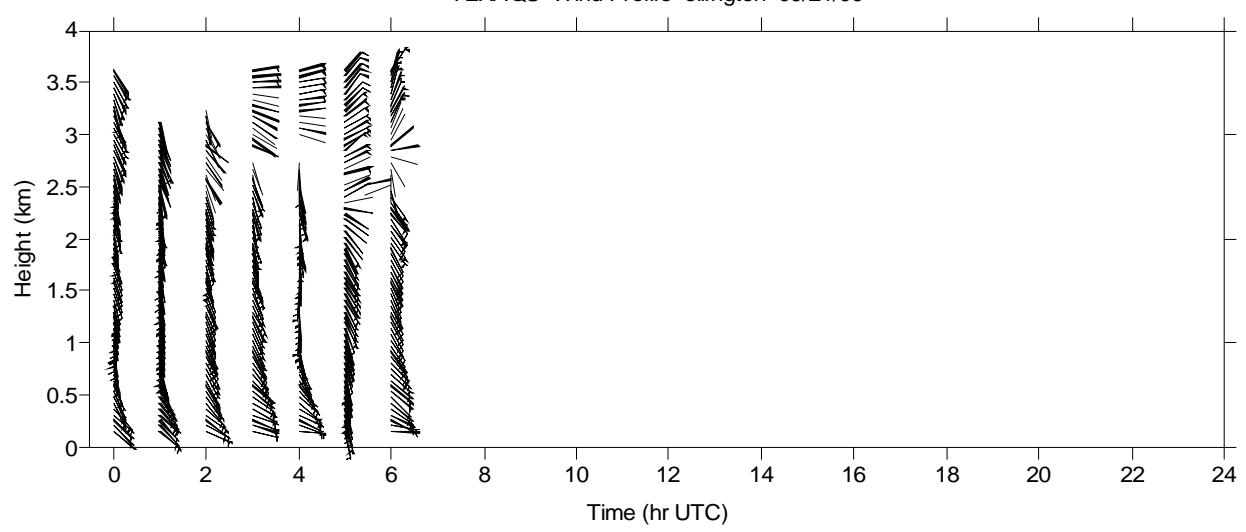
TEXAQS Wind Profile Iamarque 09/20/00



TEXAQS Wind Profile Iamarque 09/20/00



TEXAQS Wind Profile ellington 09/21/00



## Appendix II.

The table below lists the location and time of each of the soundings taken during TEXAQS-2000. Prior to September 16<sup>th</sup>, 2000, all soundings were taken at the Wharton Power Plant. After September 16<sup>th</sup> 2000, the sounding equipment was moved to the La Porte Airport. The soundings at La Porte were taken primarily to evaluate a sodar system deployed there by TNRCC. Following the table, the soundings are plotted. The plotted variables are temperature (°C), relative humidity (percent), wind speed ( $\text{m s}^{-1}$ ) and wind direction (degrees). Cases when the winds are missing are due to failure of the GPS communications during the sounding.

SITE NAME	LAUNCH DATE & TIME (UTC)	COMMENTS
Wharton Power Plant	Aug. 16, 1115	
Wharton Power Plant	Aug. 16, 1706	
Wharton Power Plant	Aug. 21, 1719	
Wharton Power Plant	Aug. 22, 0453	
Wharton Power Plant	Aug. 22, 1059	
Wharton Power Plant	Aug. 22, 1643	
Wharton Power Plant	Aug. 22, 2236	No Wind Speed or Direction
Wharton Power Plant	Aug. 23, 0458	
Wharton Power Plant	Aug. 23, 1101	
Wharton Power Plant	Aug. 23, 1641	
Wharton Power Plant	Aug. 23, 2248	
Wharton Power Plant	Aug. 24, 0509	
Wharton Power Plant	Aug. 24, 1047	
Wharton Power Plant	Aug. 24, 1658	
Wharton Power Plant	Aug. 24, 2236	
Wharton Power Plant	Aug. 25, 0442	
Wharton Power Plant	Aug. 25, 1034	
Wharton Power Plant	Aug. 25, 1645	
Wharton Power Plant	Aug. 25, 1955	
Wharton Power Plant	Aug. 25, 2222	
Wharton Power Plant	Aug. 26, 0454	
Wharton Power Plant	Aug. 26, 1051	
Wharton Power Plant	Aug. 26, 1640	
Wharton Power Plant	Aug. 26, 1946	
Wharton Power Plant	Aug. 26, 2218	
Wharton Power Plant	Aug. 27, 1034	
Wharton Power Plant	Aug. 27, 1632	
Wharton Power Plant	Aug. 27, 1922	
Wharton Power Plant	Aug. 27, 2211	
Wharton Power Plant	Aug. 28, 1658	

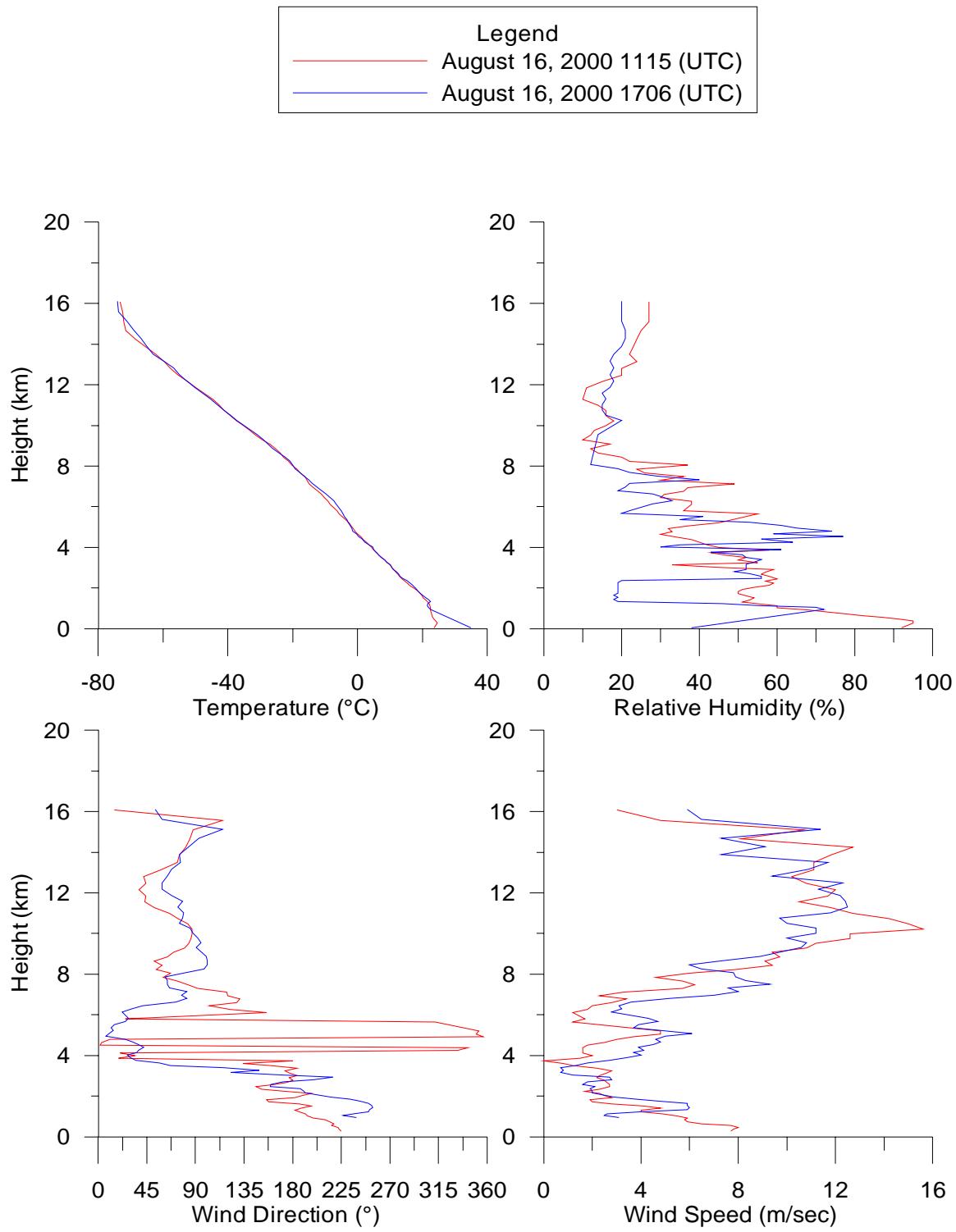
Wharton Power Plant	Aug. 28, 2250	
Wharton Power Plant	Aug. 29, 0448	
Wharton Power Plant	Aug. 29, 1700	
Wharton Power Plant	Aug. 29, 2258	
Wharton Power Plant	Aug. 30, 0450	No Relative Humidity
Wharton Power Plant	Aug. 30, 2245	
Wharton Power Plant	Aug. 31, 0446	
Wharton Power Plant	Aug. 31, 1100	
Wharton Power Plant	Aug. 31, 1705	
Wharton Power Plant	Aug. 31, 2001	
Wharton Power Plant	Aug. 31, 2301	
Wharton Power Plant	Sept. 1, 0503	
Wharton Power Plant	Sept. 1, 1100	
Wharton Power Plant	Sept. 1, 1659	
Wharton Power Plant	Sept. 1, 2251	
Wharton Power Plant	Sept. 2, 0456	
Wharton Power Plant	Sept. 2, 1103	
Wharton Power Plant	Sept. 2, 1635	
Wharton Power Plant	Sept. 2, 2245	
Wharton Power Plant	Sept. 3, 1656	
Wharton Power Plant	Sept. 3, 2242	
Wharton Power Plant	Sept. 4, 0521	
Wharton Power Plant	Sept. 4, 1048	
Wharton Power Plant	Sept. 4, 1656	
Wharton Power Plant	Sept. 4, 2242	
Wharton Power Plant	Sept. 5, 0459	
Wharton Power Plant	Sept. 5, 1058	
Wharton Power Plant	Sept. 5, 1659	
Wharton Power Plant	Sept. 5, 2259	
Wharton Power Plant	Sept. 6, 0540	No Wind Speed or Direction
Wharton Power Plant	Sept. 6, 1059	No Wind Speed or Direction
Wharton Power Plant	Sept. 6, 1708	No Wind Speed or Direction
Wharton Power Plant	Sept. 6, 1956	No Wind Speed or Direction
Wharton Power Plant	Sept. 6, 2253	No Wind Speed or Direction
Wharton Power Plant	Sept. 7, 0500	No Wind Speed or Direction
Wharton Power Plant	Sept. 7, 1953	No Wind Speed or Direction
Wharton Power Plant	Sept. 7, 2241	No Wind Speed or Direction
Wharton Power Plant	Sept. 8, 0513	No Wind Speed or Direction
Wharton Power Plant	Sept. 8, 1107	No Wind Speed or Direction
Wharton Power Plant	Sept. 8, 1704	No Wind Speed or Direction
Wharton Power Plant	Sept. 8, 2000	No Wind Speed or Direction

Wharton Power Plant	Sept. 8, 2305	No Wind Speed or Direction
Wharton Power Plant	Sept. 9, 1058	No Wind Speed, Direction, or Relative Humidity
Wharton Power Plant	Sept. 9, 1648	No Wind Speed or Direction
Wharton Power Plant	Sept. 9, 2234	No Wind Speed or Direction
Wharton Power Plant	Sept. 10, 0550	No Wind Speed or Direction
Wharton Power Plant	Sept. 10, 1057	No Wind Speed or Direction
Wharton Power Plant	Sept. 10, 1656	No Wind Speed, Direction, or Relative Humidity
Wharton Power Plant	Sept. 10, 1954	No Wind Speed or Direction
Wharton Power Plant	Sept. 10, 2304	
Wharton Power Plant	Sept. 11, 0501	
Wharton Power Plant	Sept. 11, 1059	
Wharton Power Plant	Sept. 11, 1709	
Wharton Power Plant	Sept. 11, 2000	
Wharton Power Plant	Sept. 11, 2308	
Wharton Power Plant	Sept. 12, 0458	
Wharton Power Plant	Sept. 12, 1700	
Wharton Power Plant	Sept. 12, 2000	
Wharton Power Plant	Sept. 12, 2258	
Wharton Power Plant	Sept. 13, 0549	
Wharton Power Plant	Sept. 13, 1138	
Wharton Power Plant	Sept. 13, 1709	
Wharton Power Plant	Sept. 13, 2005	
Wharton Power Plant	Sept. 13, 2301	
Wharton Power Plant	Sept. 14, 0502	
Wharton Power Plant	Sept. 14, 1651	
Wharton Power Plant	Sept. 14, 1939	
Wharton Power Plant	Sept. 14, 2224	
Wharton Power Plant	Sept. 15, 0458	
Wharton Power Plant	Sept. 15, 1101	
Wharton Power Plant	Sept. 15, 1702	
Wharton Power Plant	Sept. 15, 1957	
Wharton Power Plant	Sept. 15, 2256	
La Porte Airport	Sept. 17, 1102	Relative Humidity Problems
La Porte Airport	Sept. 17, 1133	
La Porte Airport	Sept. 17, 1158	
La Porte Airport	Sept. 17, 1219	Relative Humidity Problems
La Porte Airport	Sept. 17, 1239	
La Porte Airport	Sept. 17, 1452	
La Porte Airport	Sept. 17, 1525	

La Porte Airport	Sept. 17, 1550	
La Porte Airport	Sept. 17, 1613	
La Porte Airport	Sept. 17, 1952	
La Porte Airport	Sept. 17, 2037	
La Porte Airport	Sept. 17, 2111	
La Porte Airport	Sept. 17, 2354	
La Porte Airport	Sept. 18, 0020	
La Porte Airport	Sept. 18, 0047	
La Porte Airport	Sept. 18, 0108	
La Porte Airport	Sept. 18, 1118	
La Porte Airport	Sept. 18, 1142	
La Porte Airport	Sept. 18, 1210	
La Porte Airport	Sept. 18, 1235	
La Porte Airport	Sept. 18, 1301	
La Porte Airport	Sept. 18, 1550	
La Porte Airport	Sept. 18, 1633	
La Porte Airport	Sept. 18, 1651	
La Porte Airport	Sept. 18, 1711	
La Porte Airport	Sept. 18, 1736	
La Porte Airport	Sept. 18, 2039	
La Porte Airport	Sept. 18, 2115	
La Porte Airport	Sept. 18, 2150	
La Porte Airport	Sept. 18, 2242	
La Porte Airport	Sept. 18, 2357	
La Porte Airport	Sept. 19, 0023	Relative Humidity Problems
La Porte Airport	Sept. 19, 0055	
La Porte Airport	Sept. 19, 0134	
La Porte Airport	Sept. 19, 0201	

# Rawinsonde Profiles TEXAQS 2000

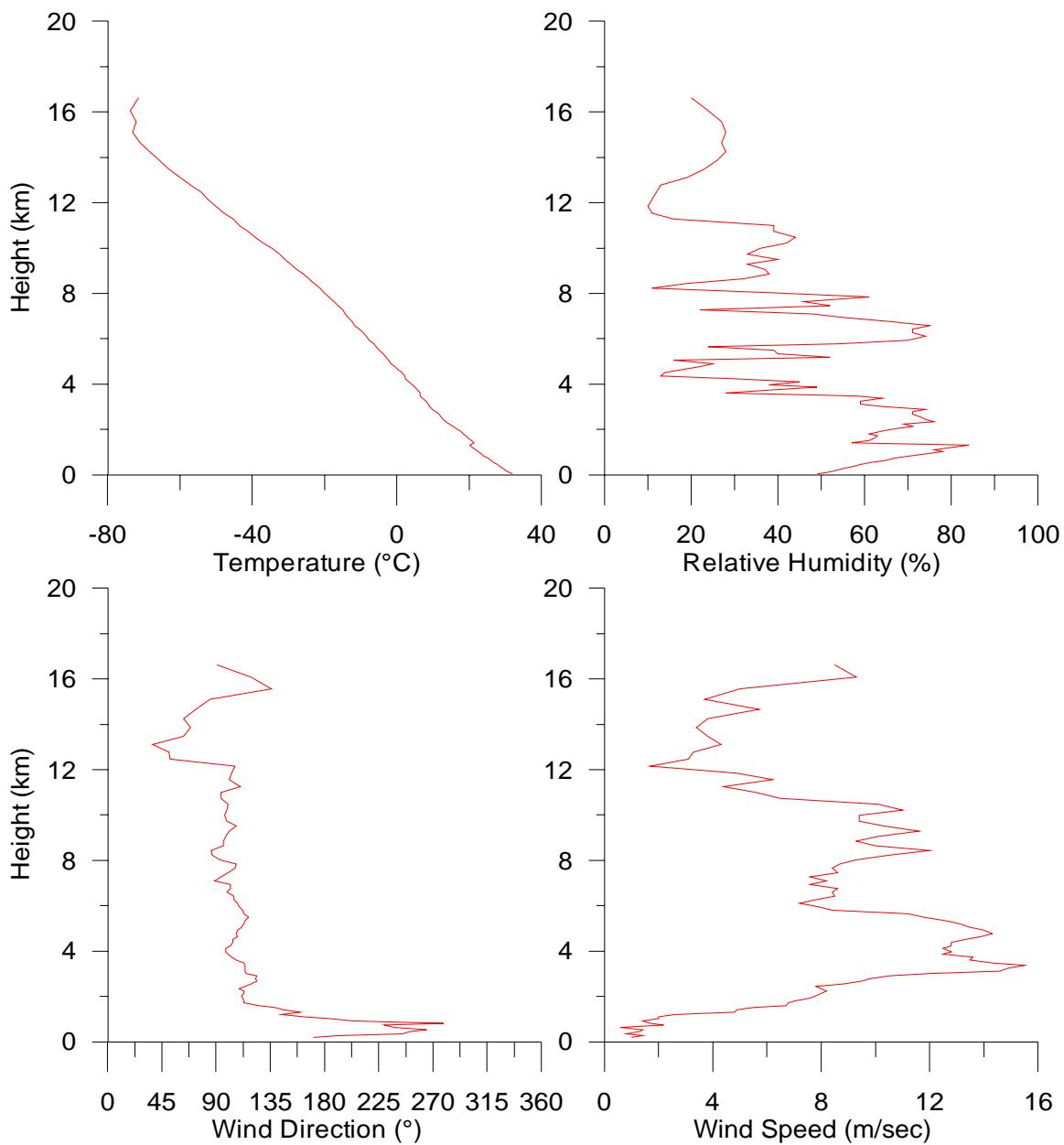
Wharton Power Plant, North Houston, Texas



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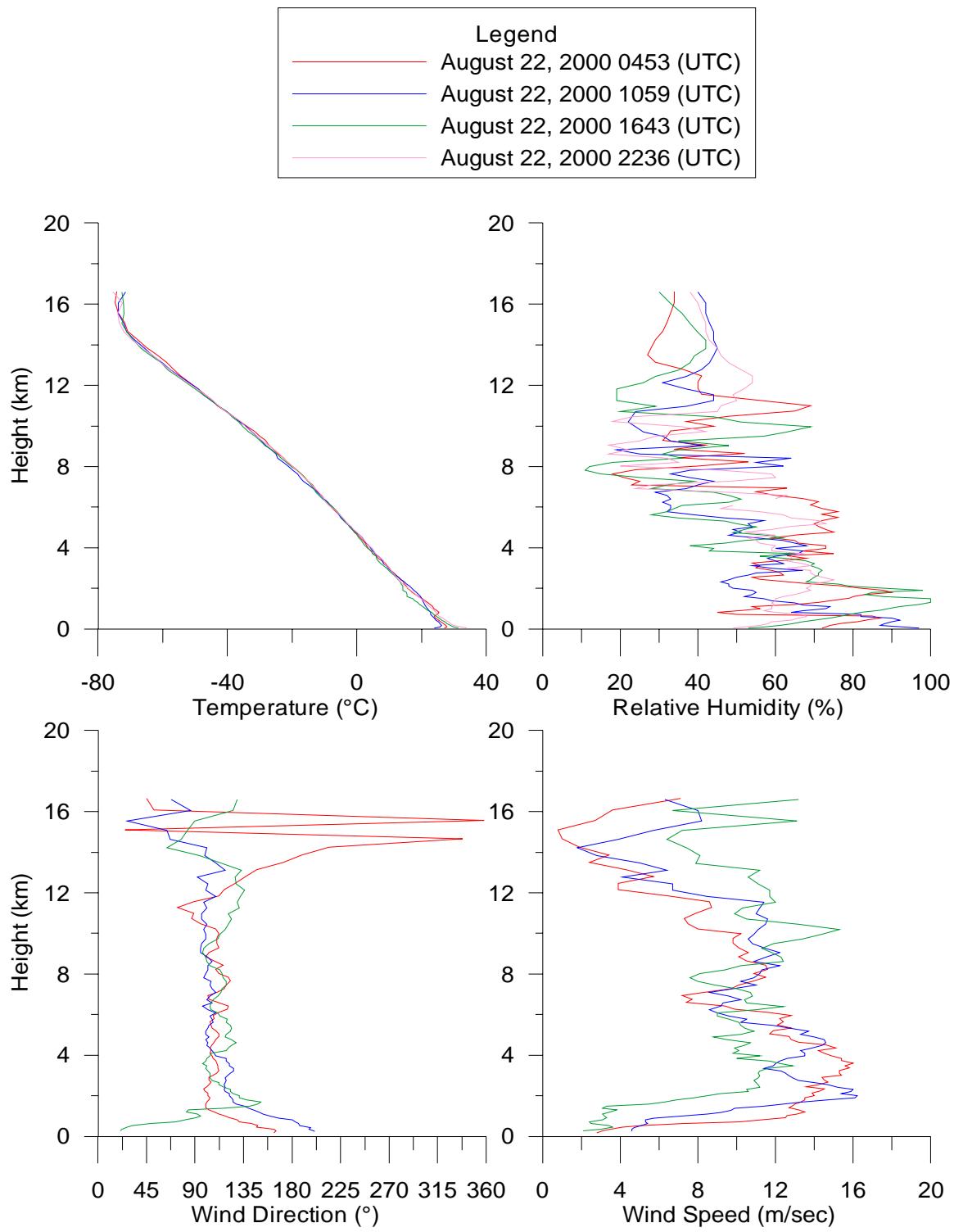
Wharton Power Plant, North Houston, Texas

Legend  
August 21, 2000 1719 (UTC)



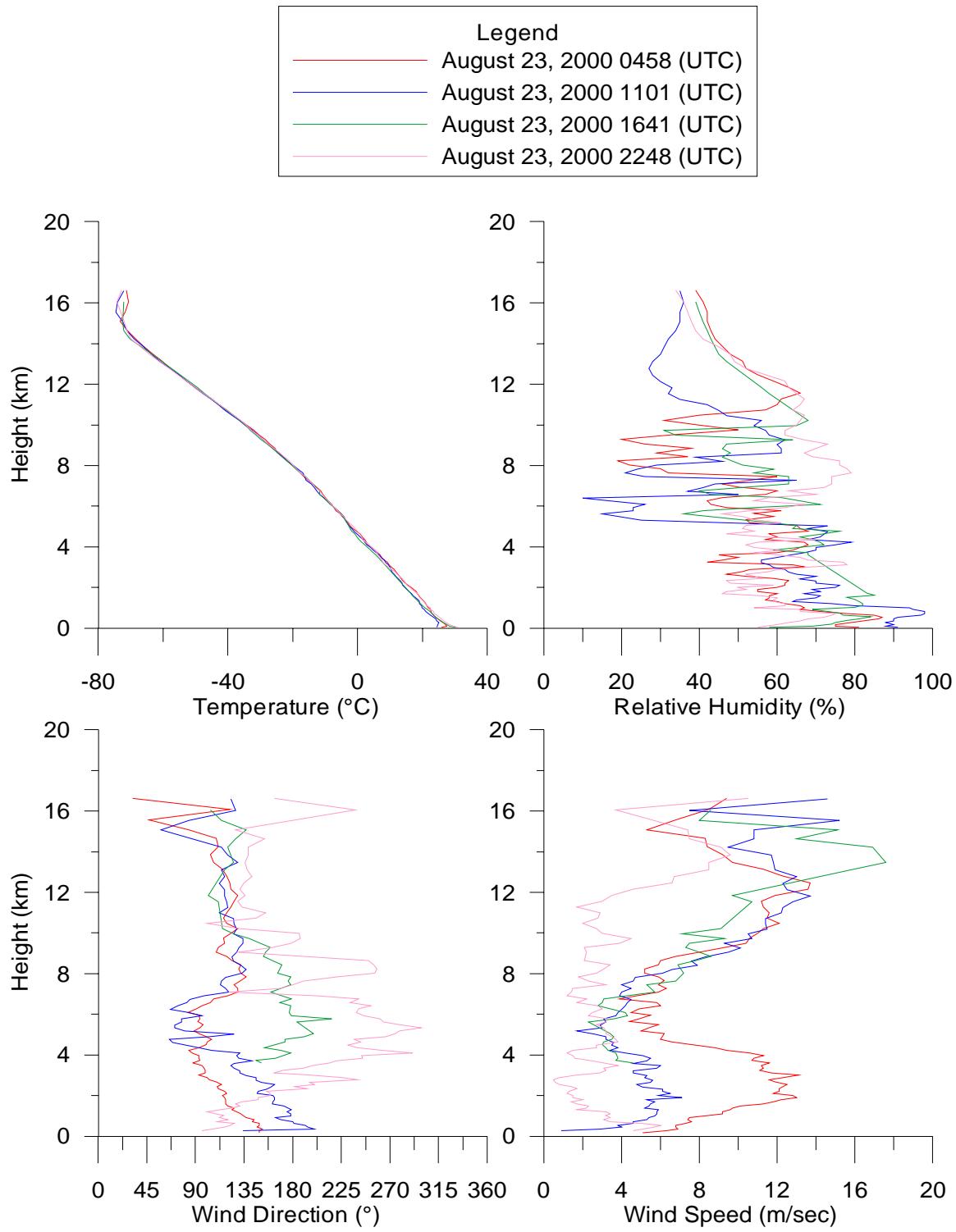
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Wharton Power Plant, North Houston, Texas



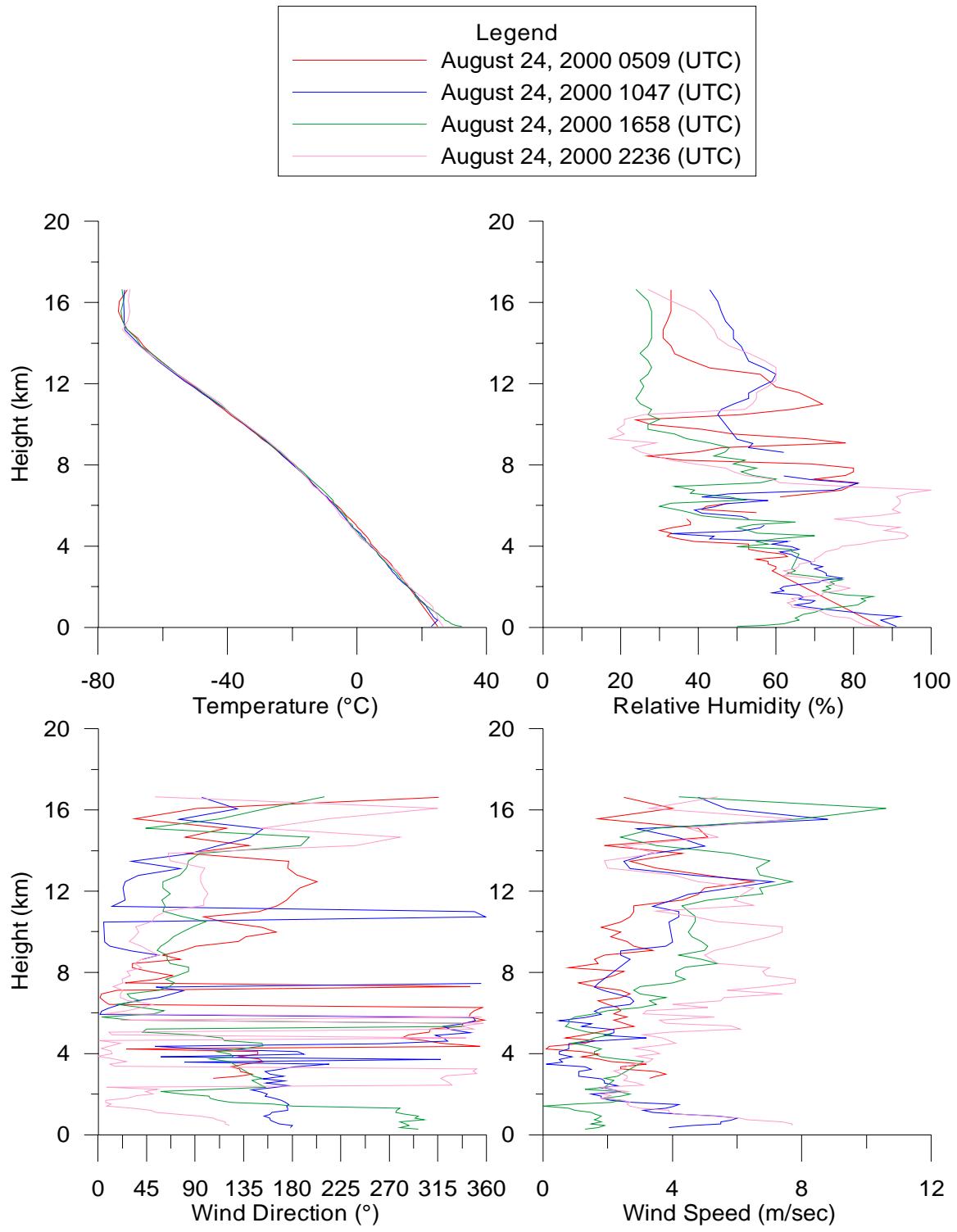
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Wharton Power Plant, North Houston, Texas



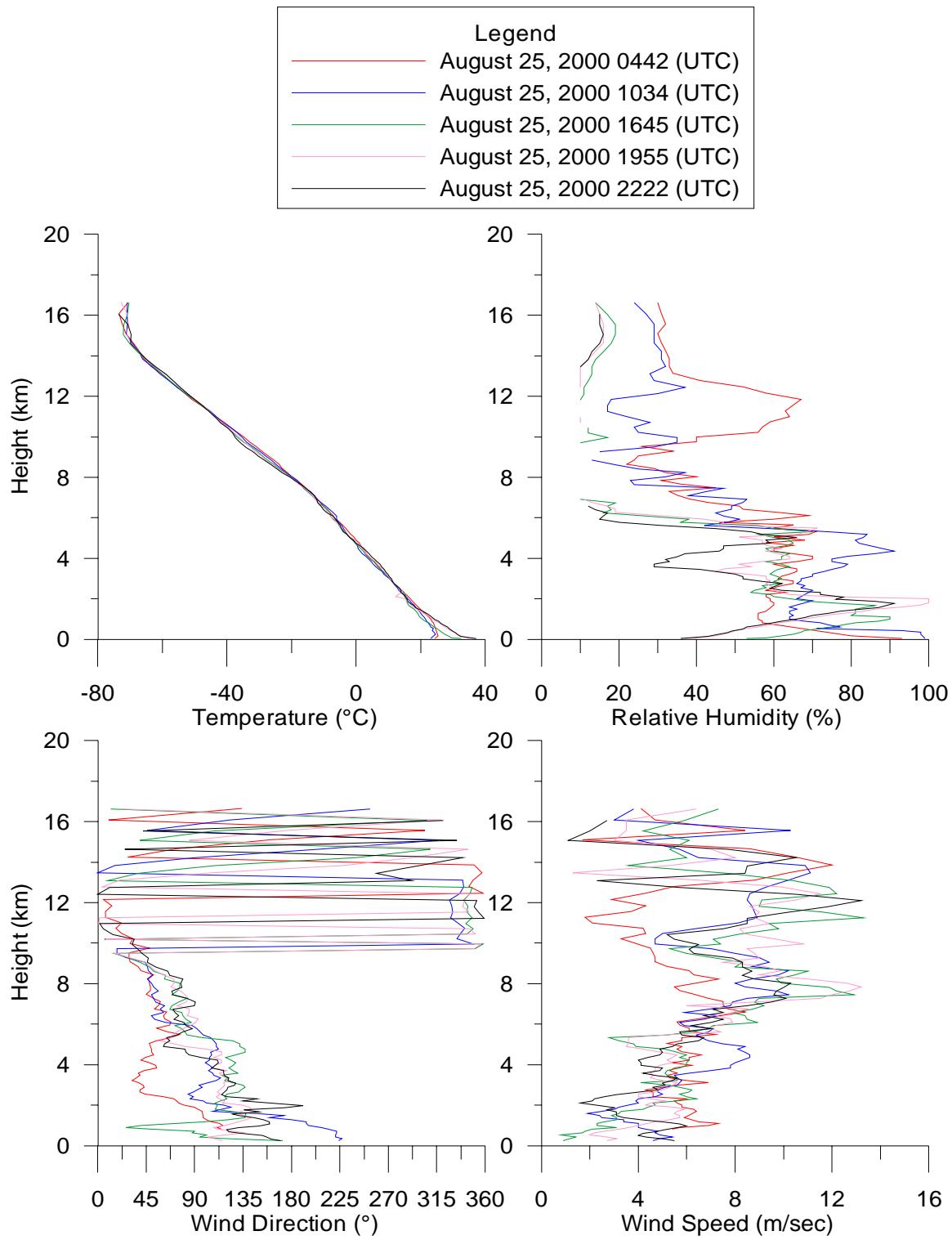
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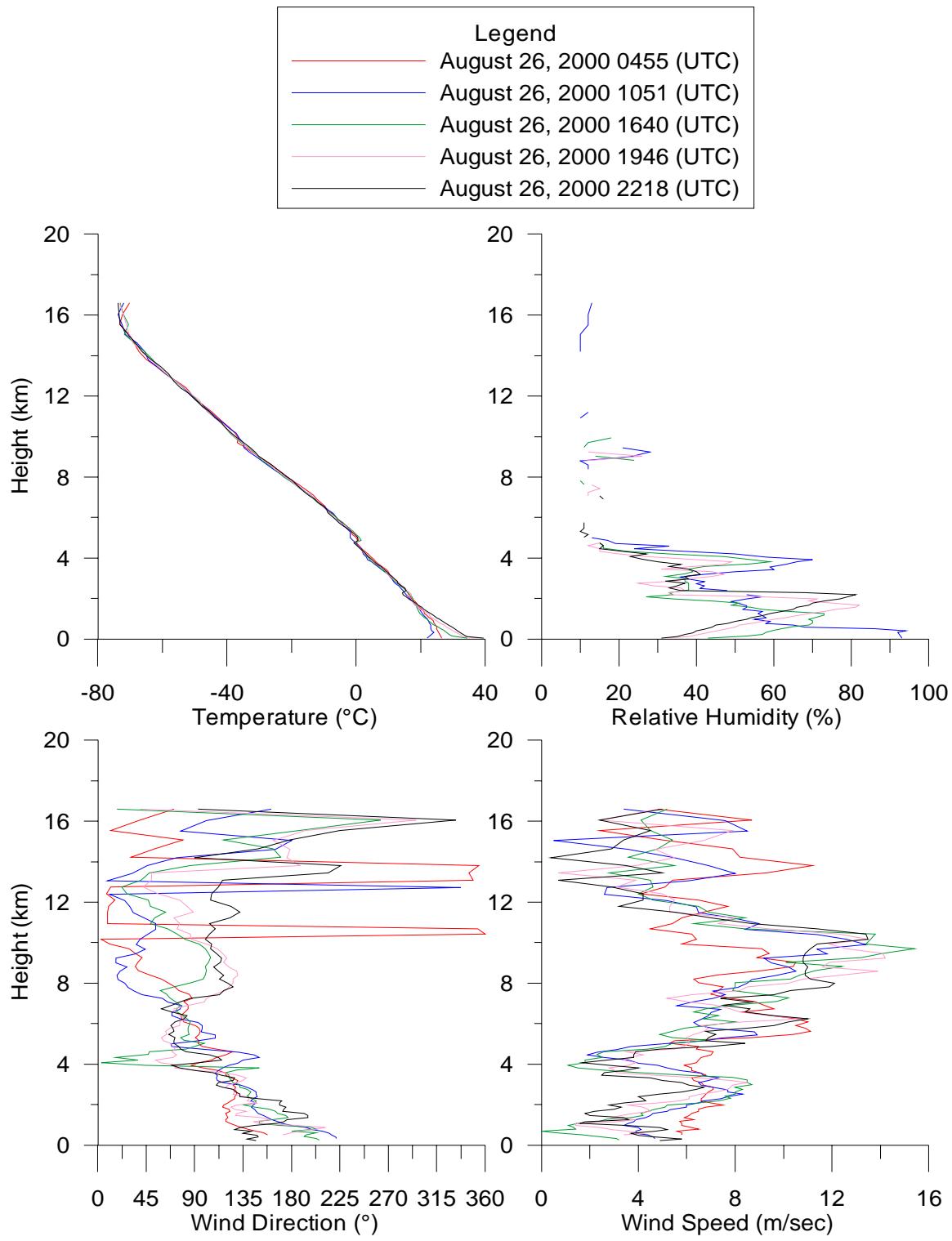
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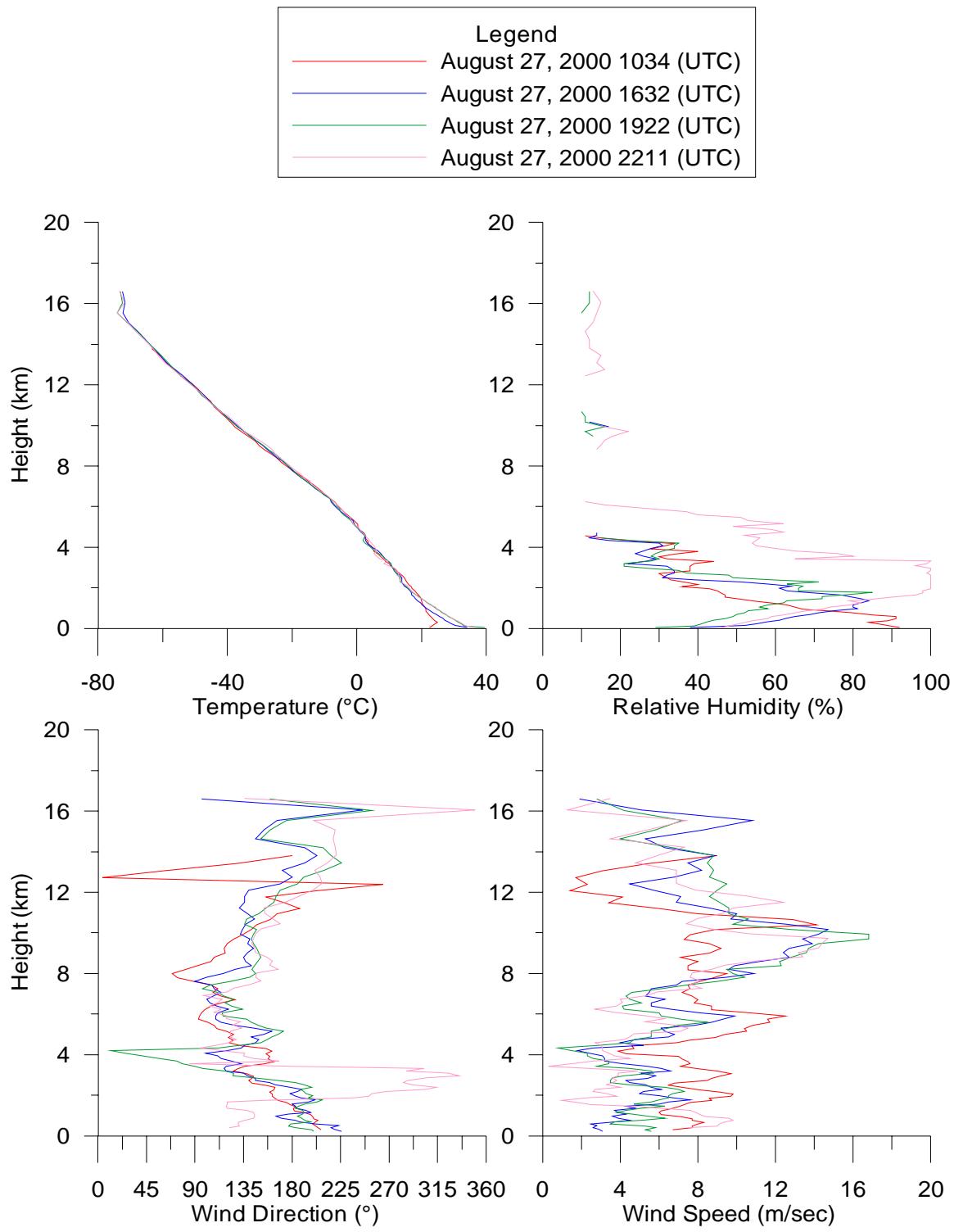
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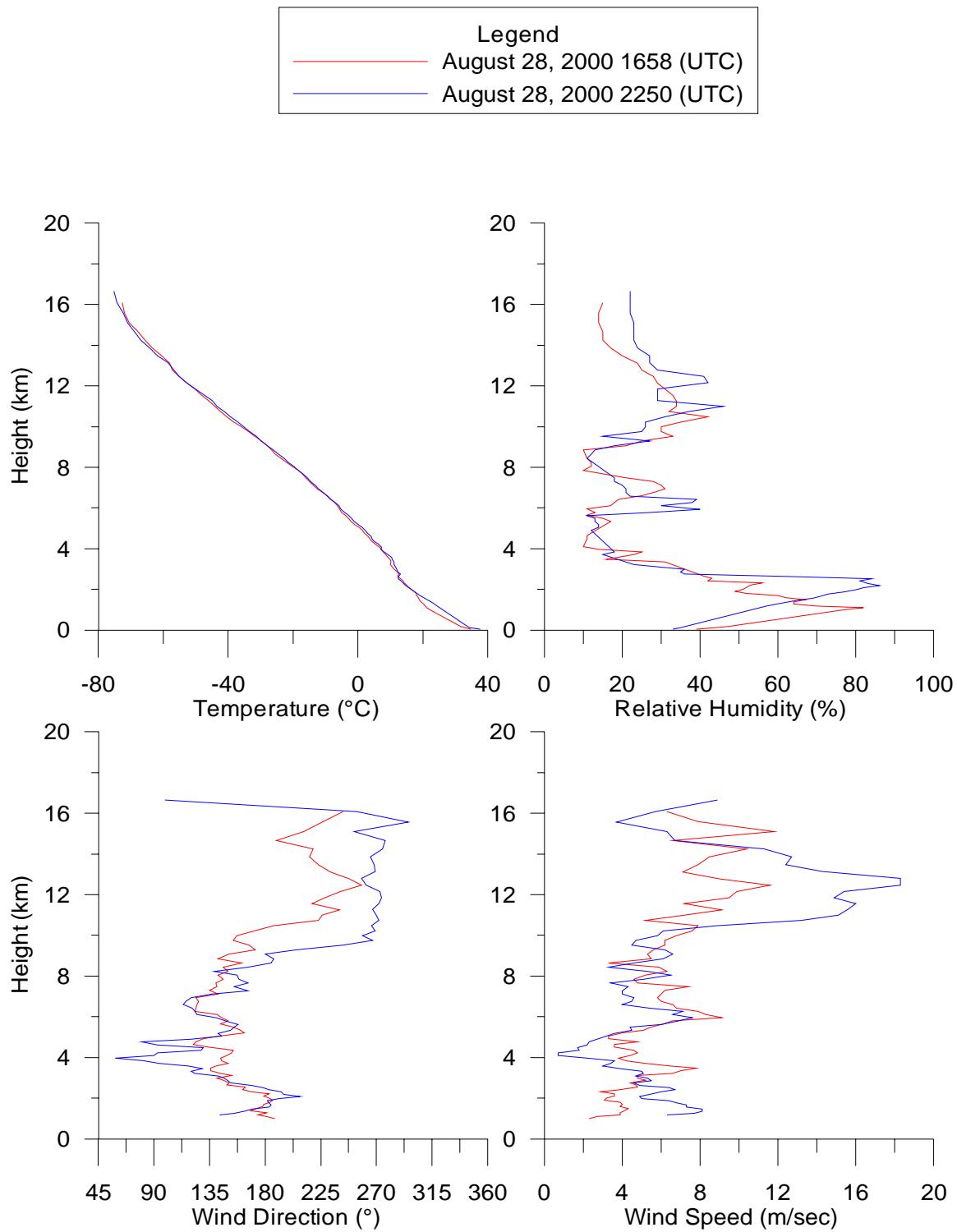
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Wharton Power Plant, North Houston, Texas



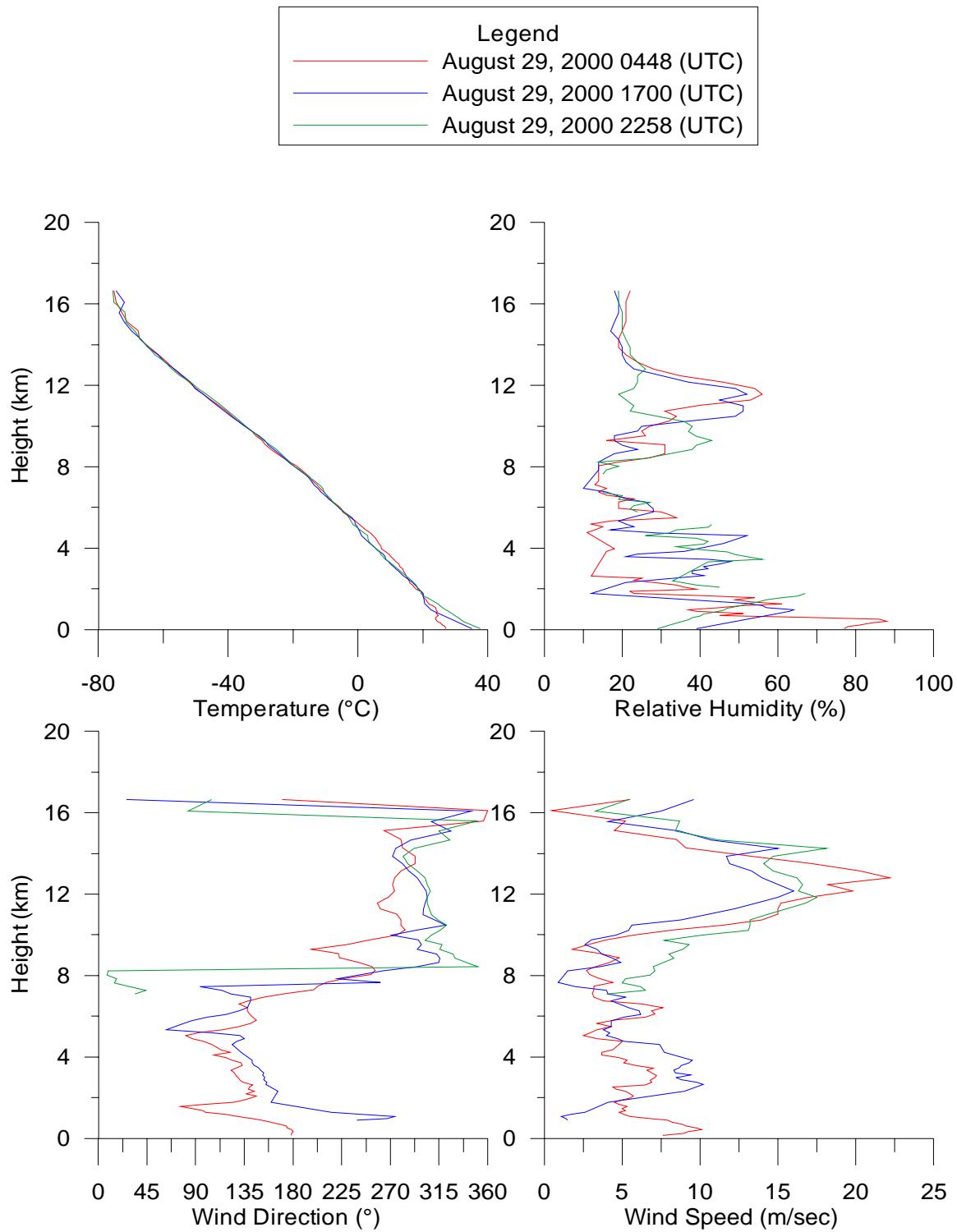
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Wharton Power Plant, North Houston, Texas



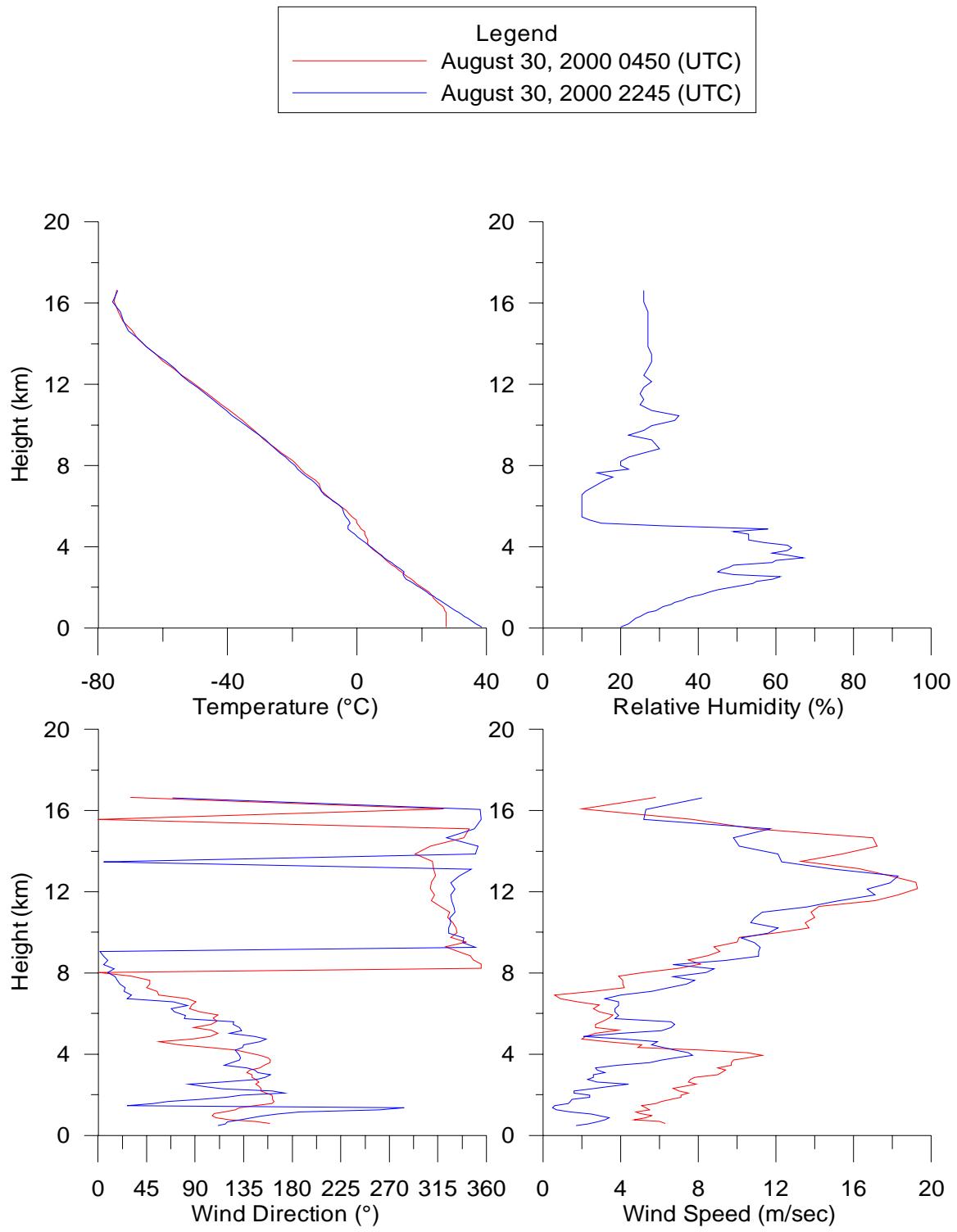
# Rawinsonde Profiles TEXAQS 2000

Wharton Power Plant, North Houston, Texas



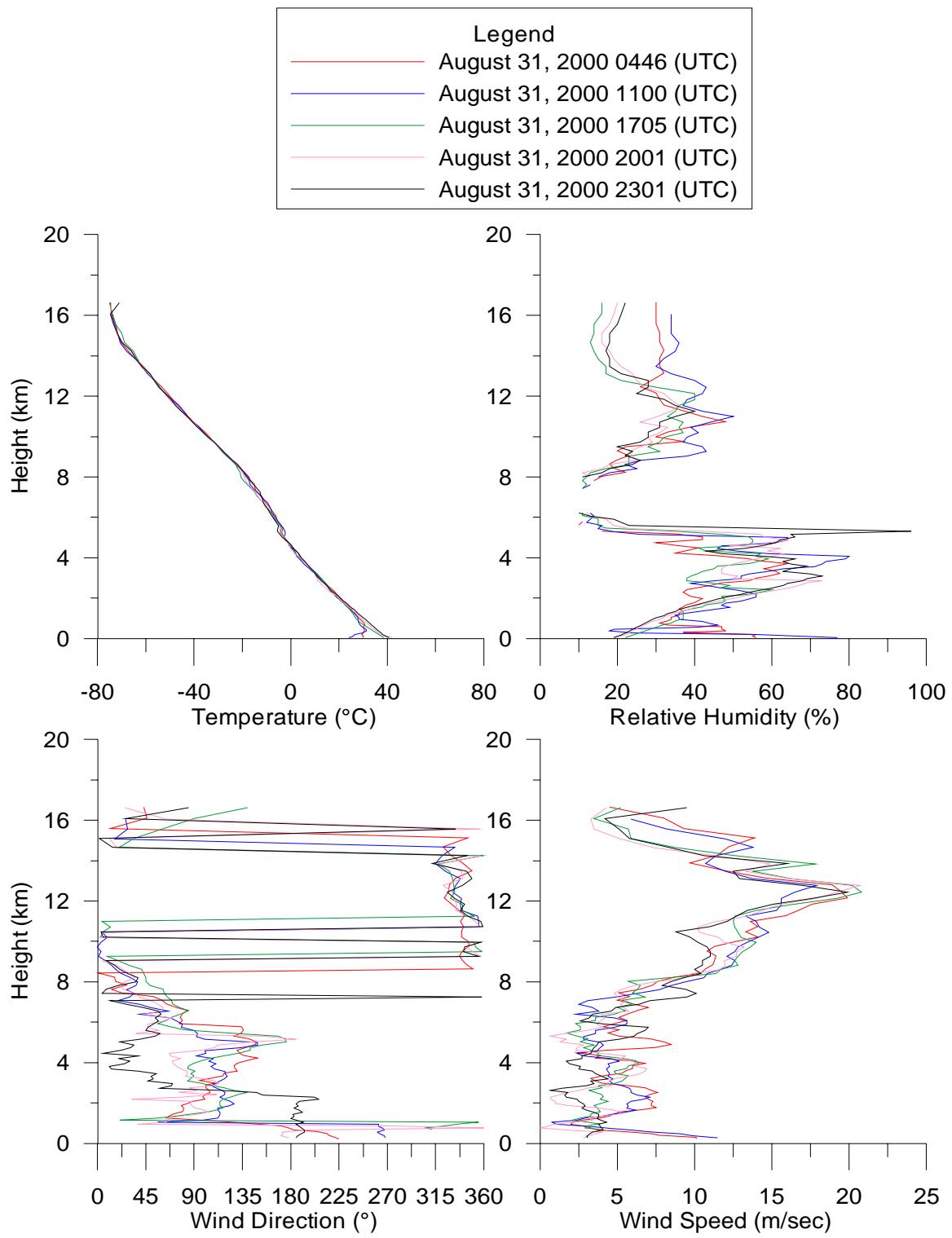
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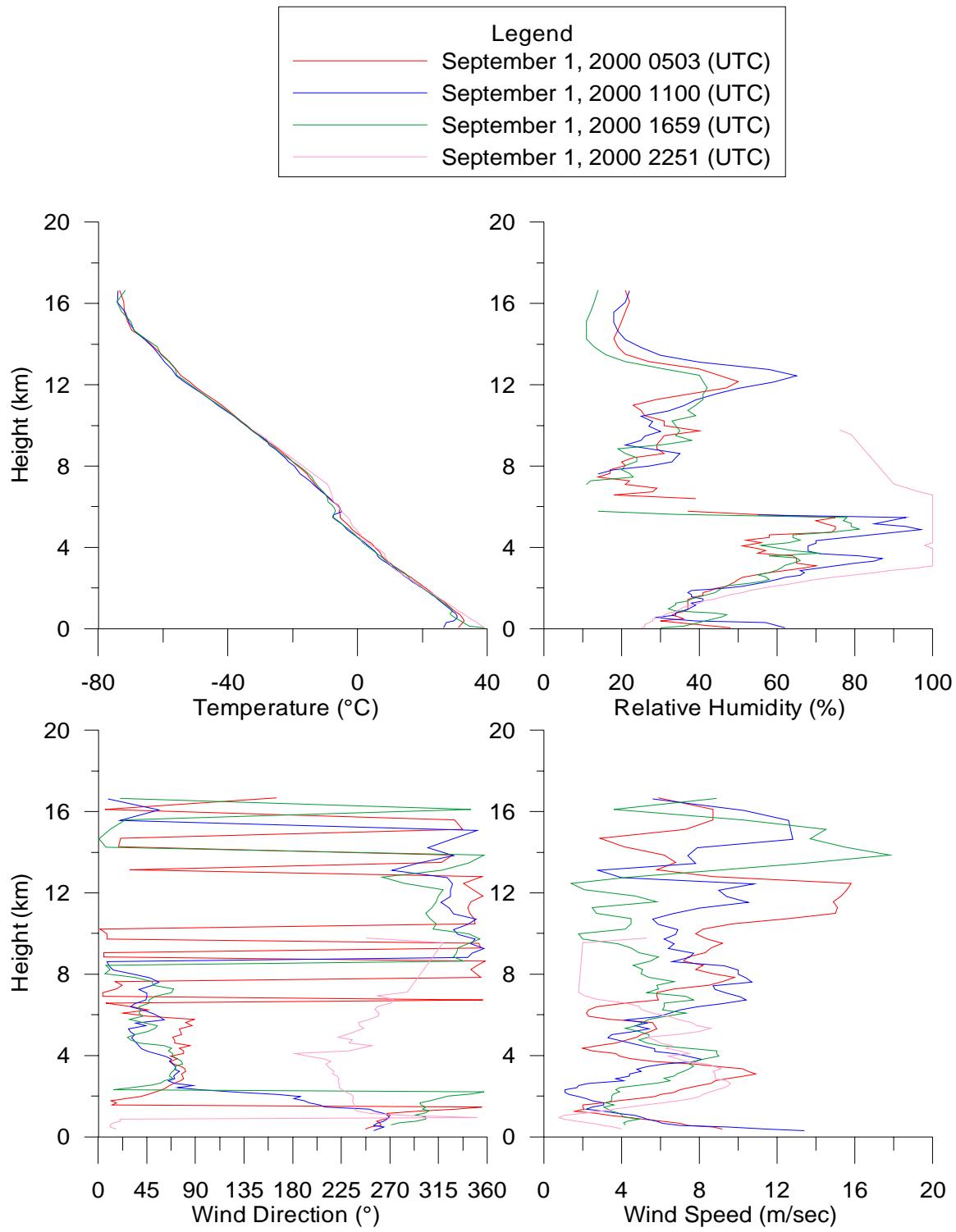
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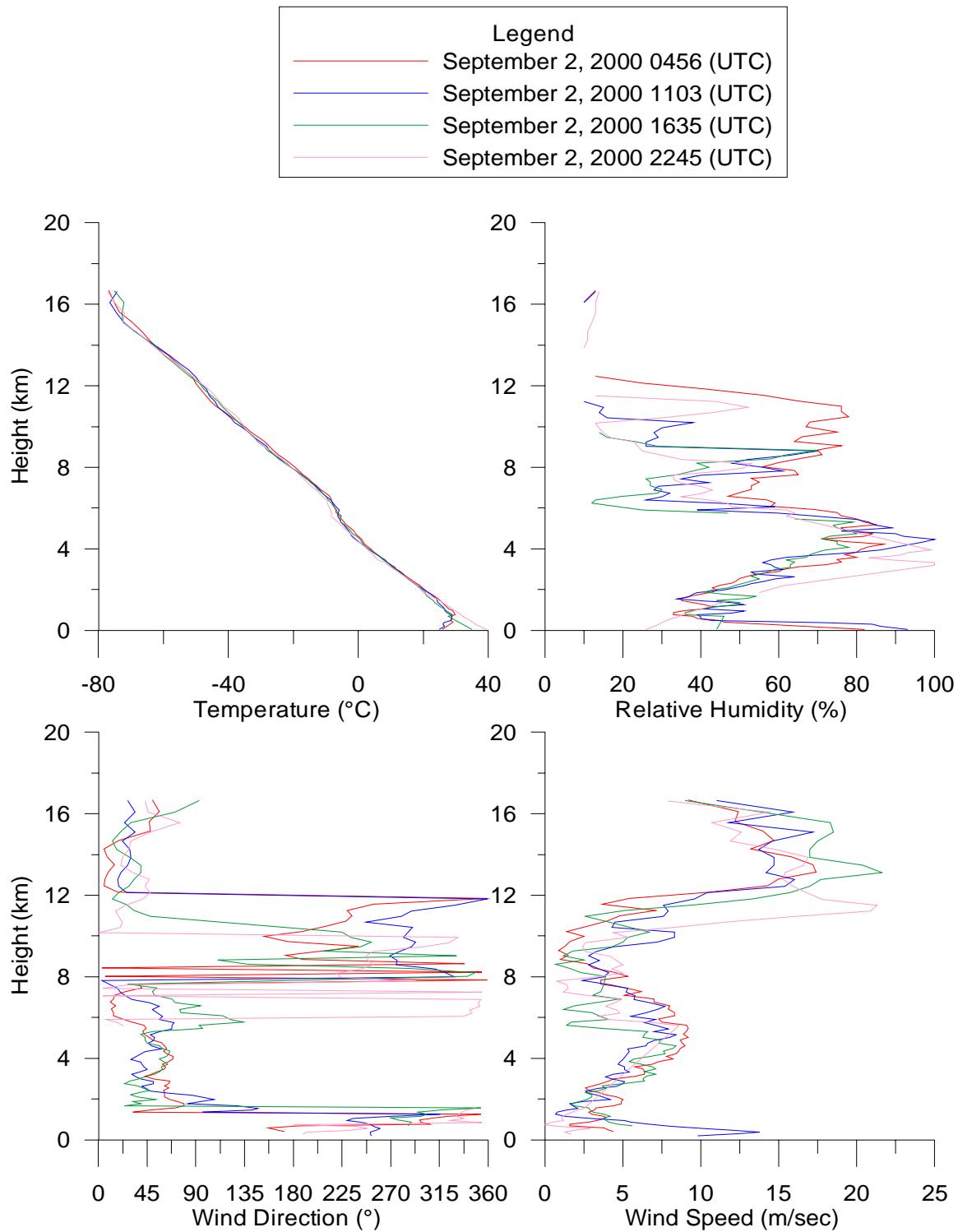
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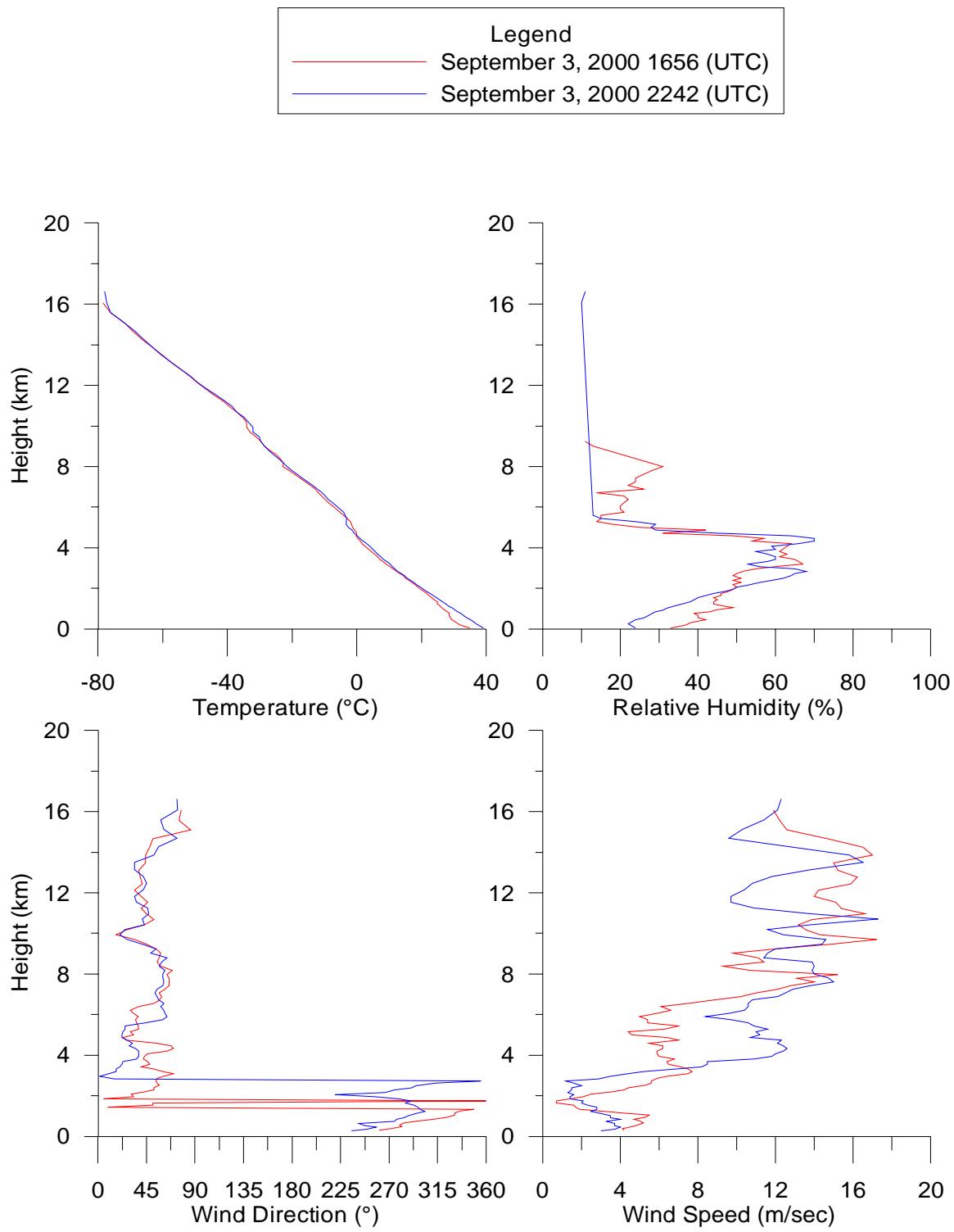
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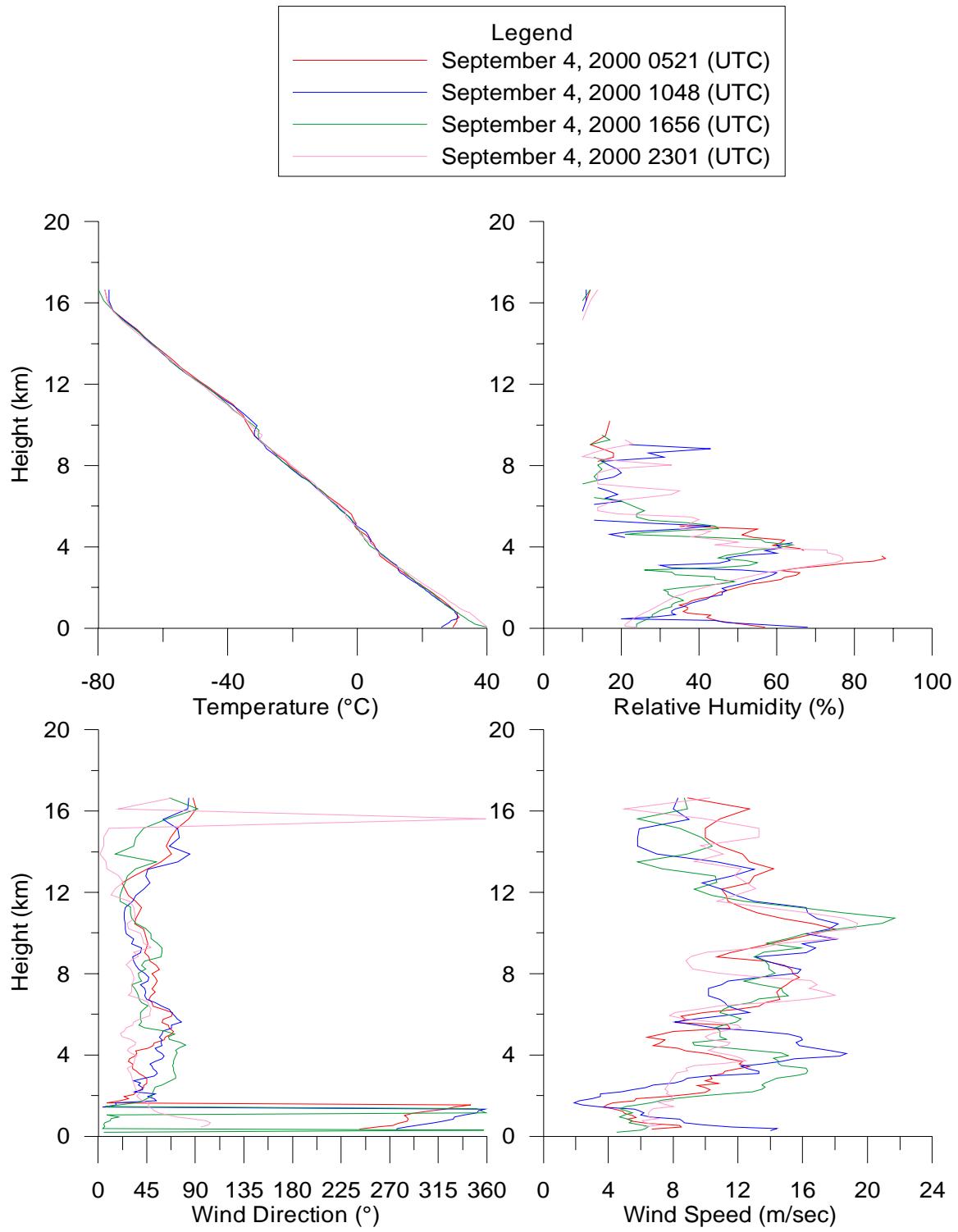
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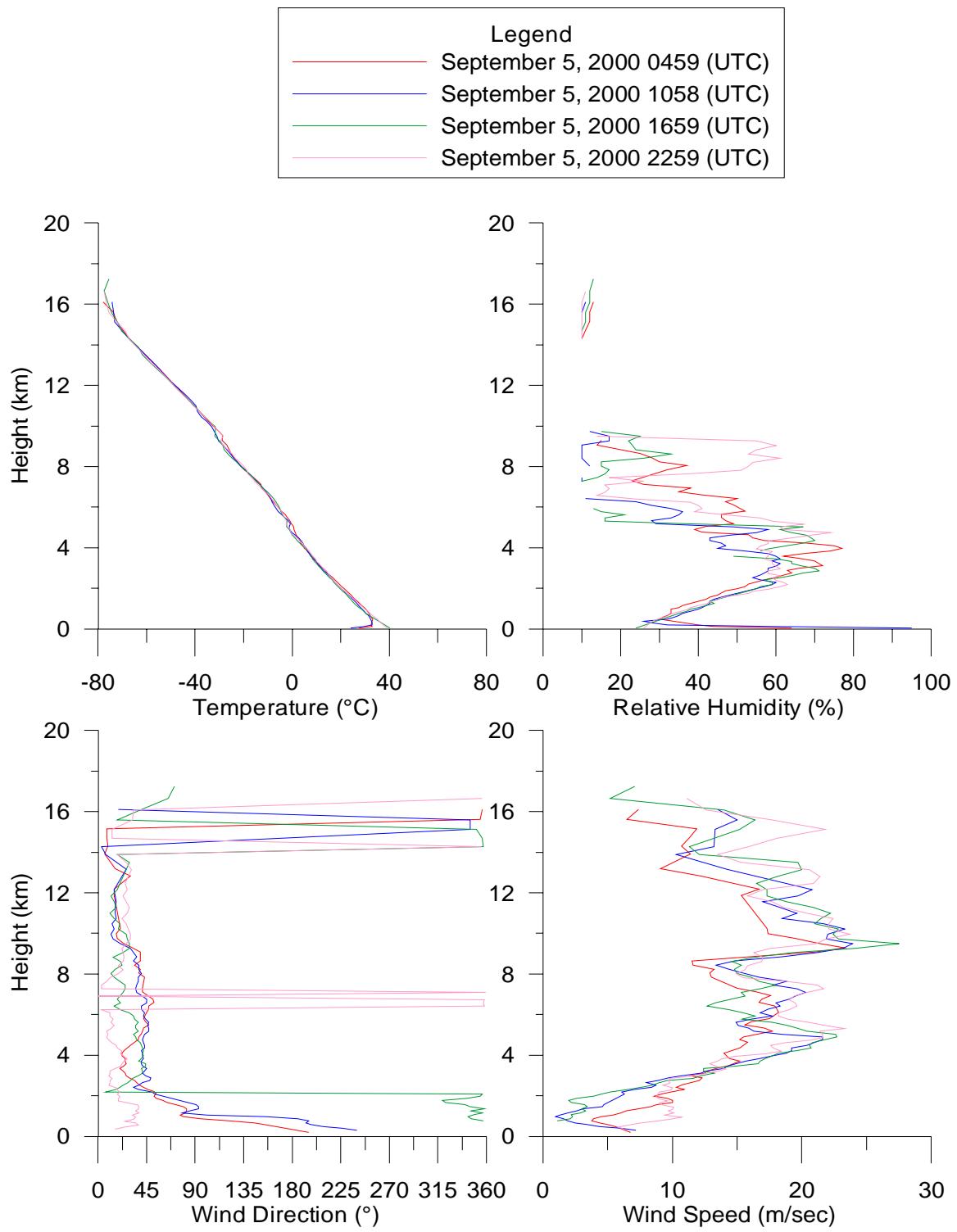
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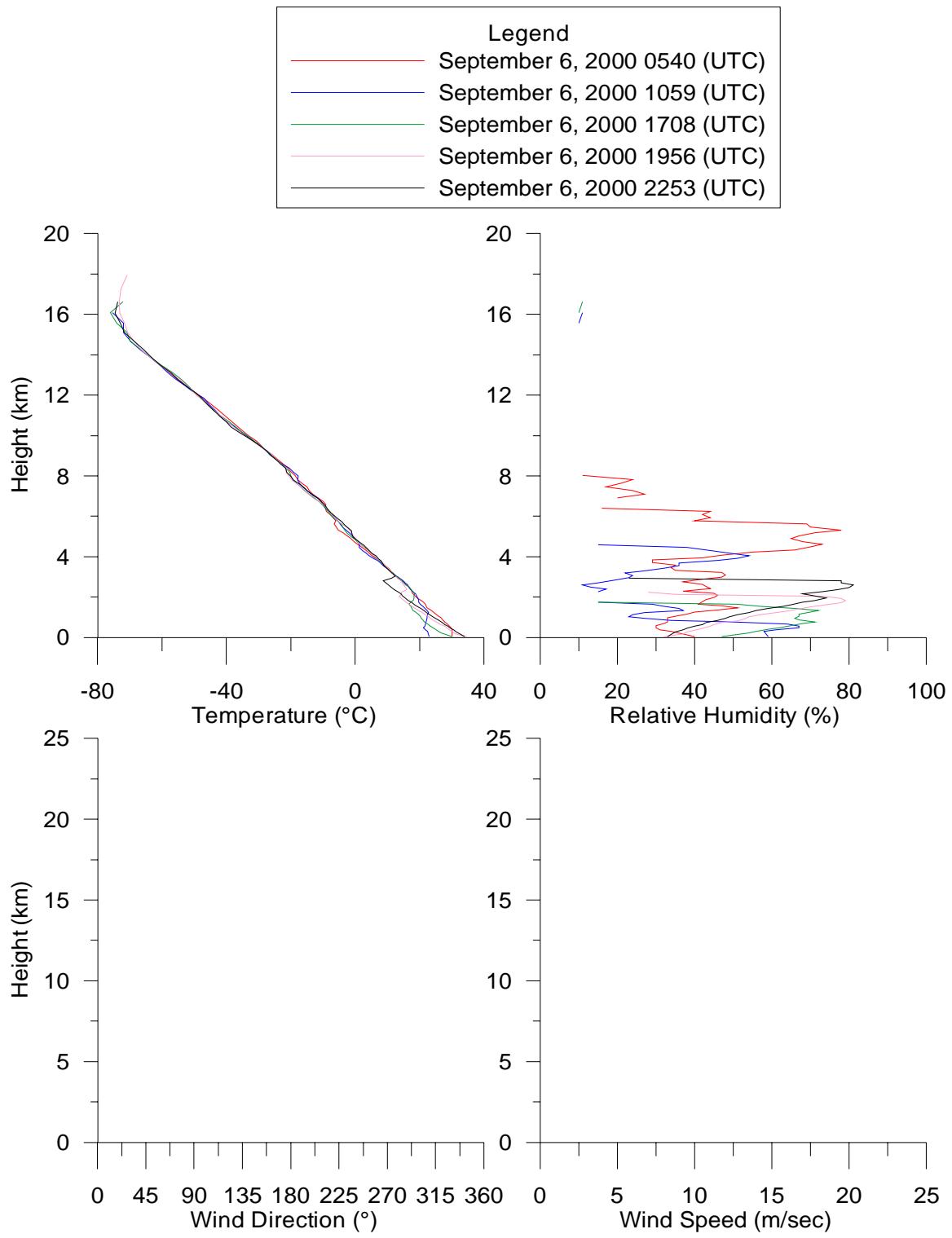
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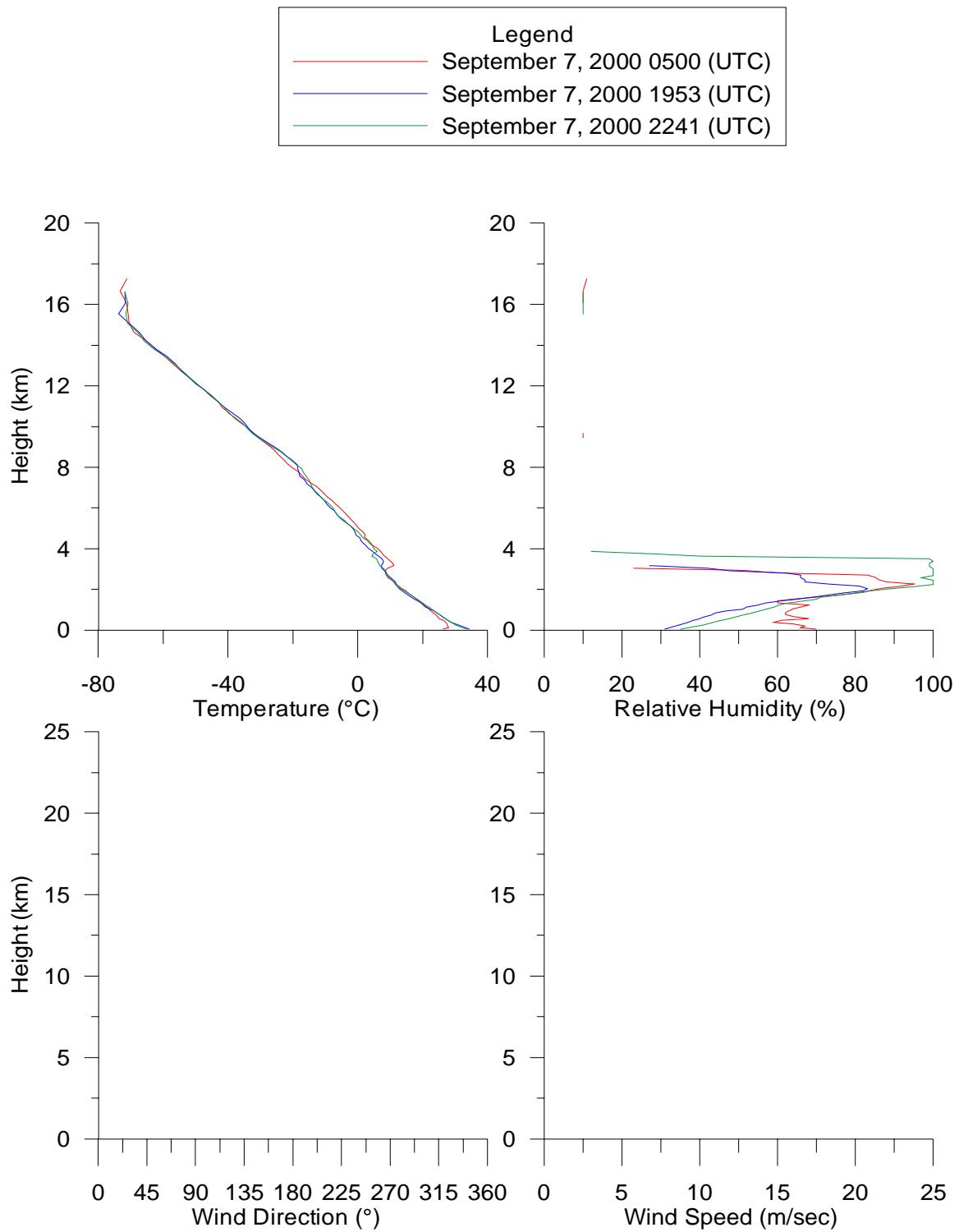
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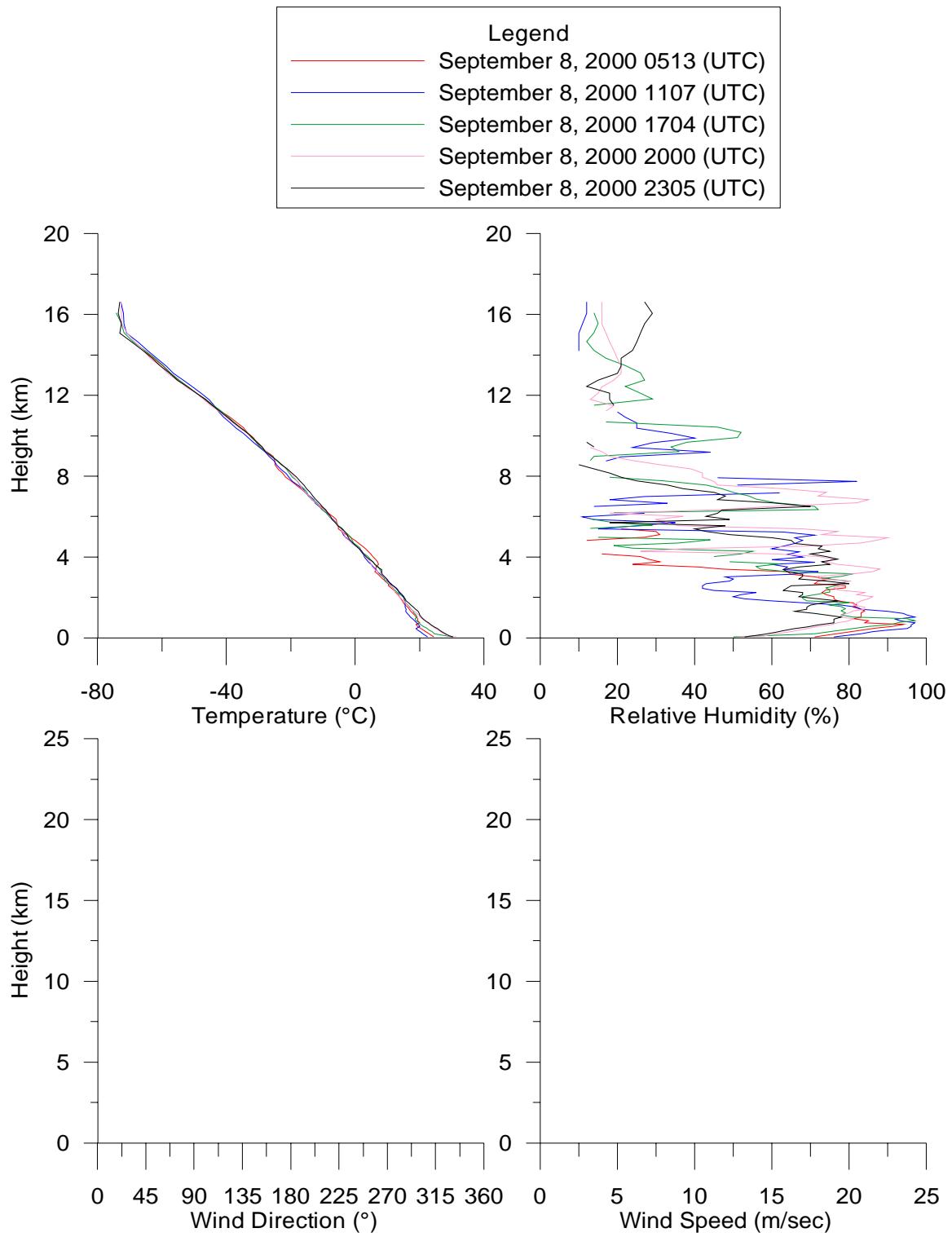
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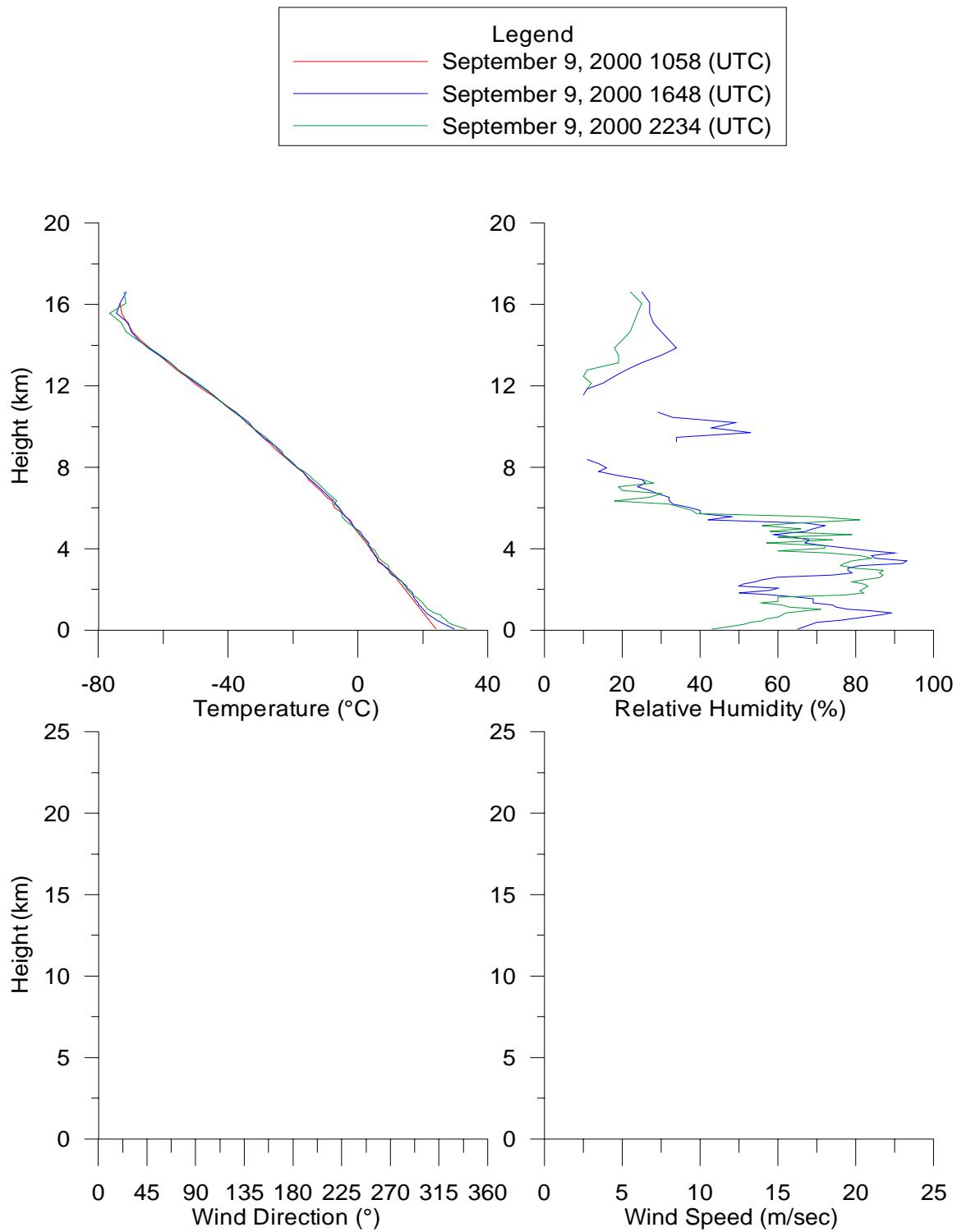
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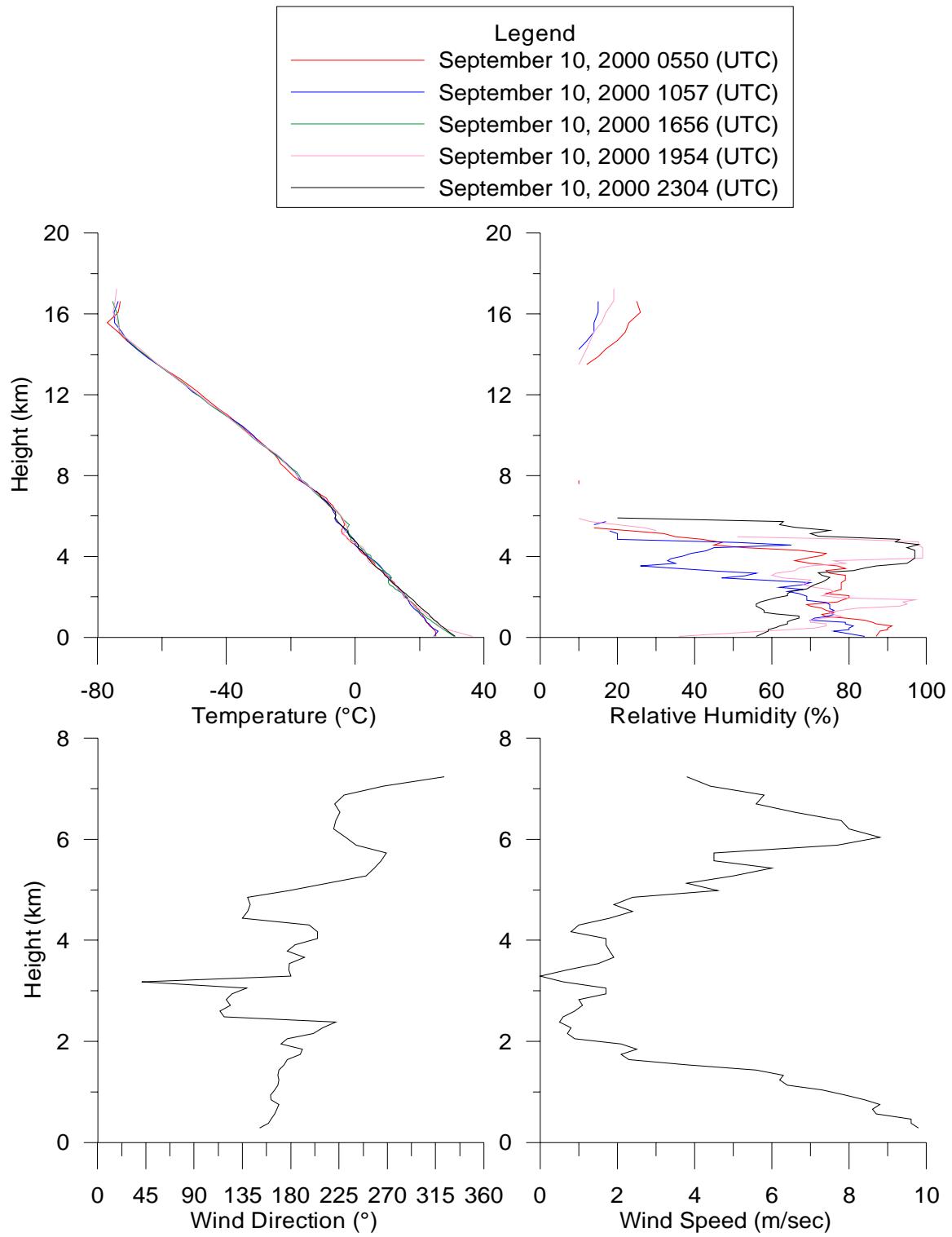
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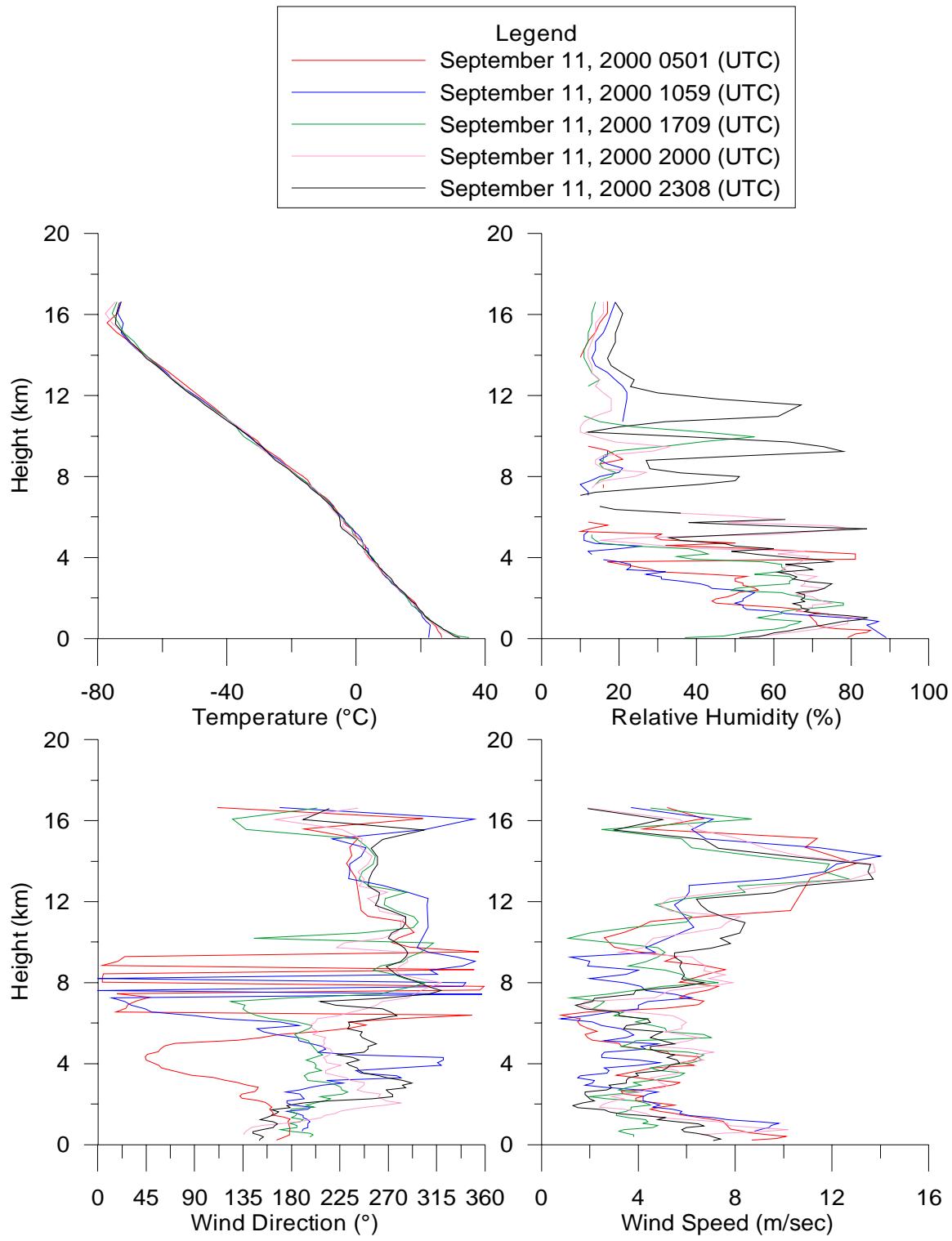
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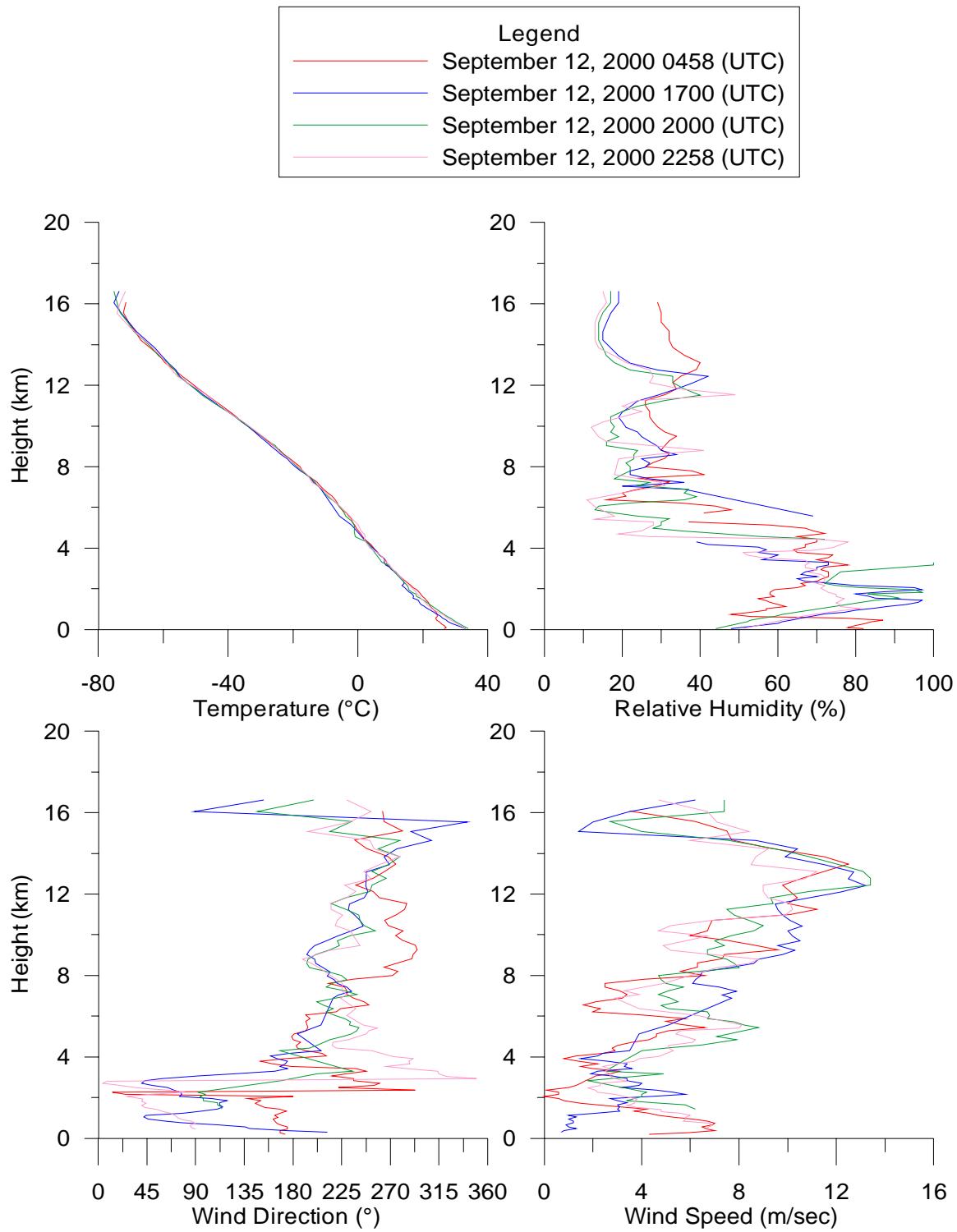
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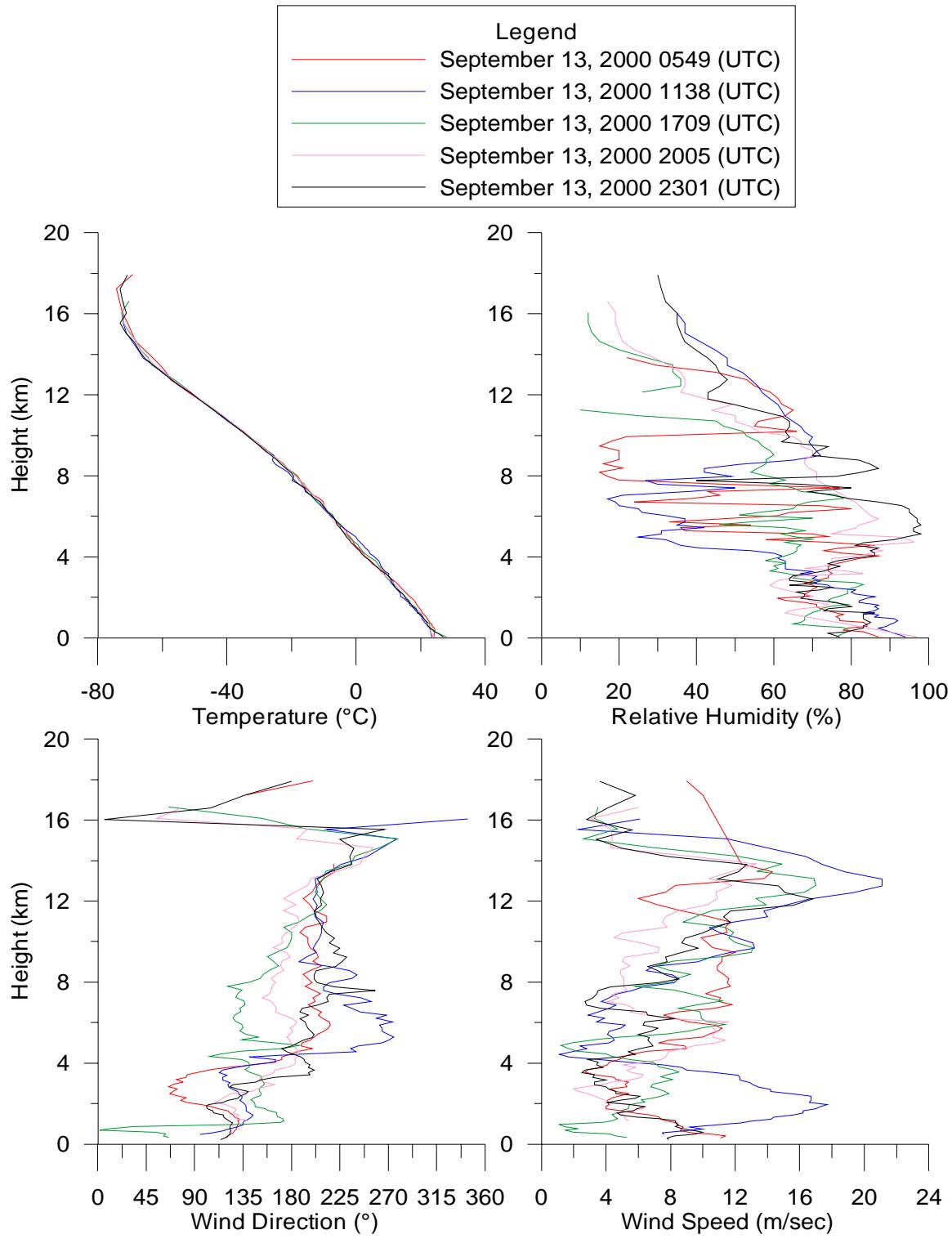
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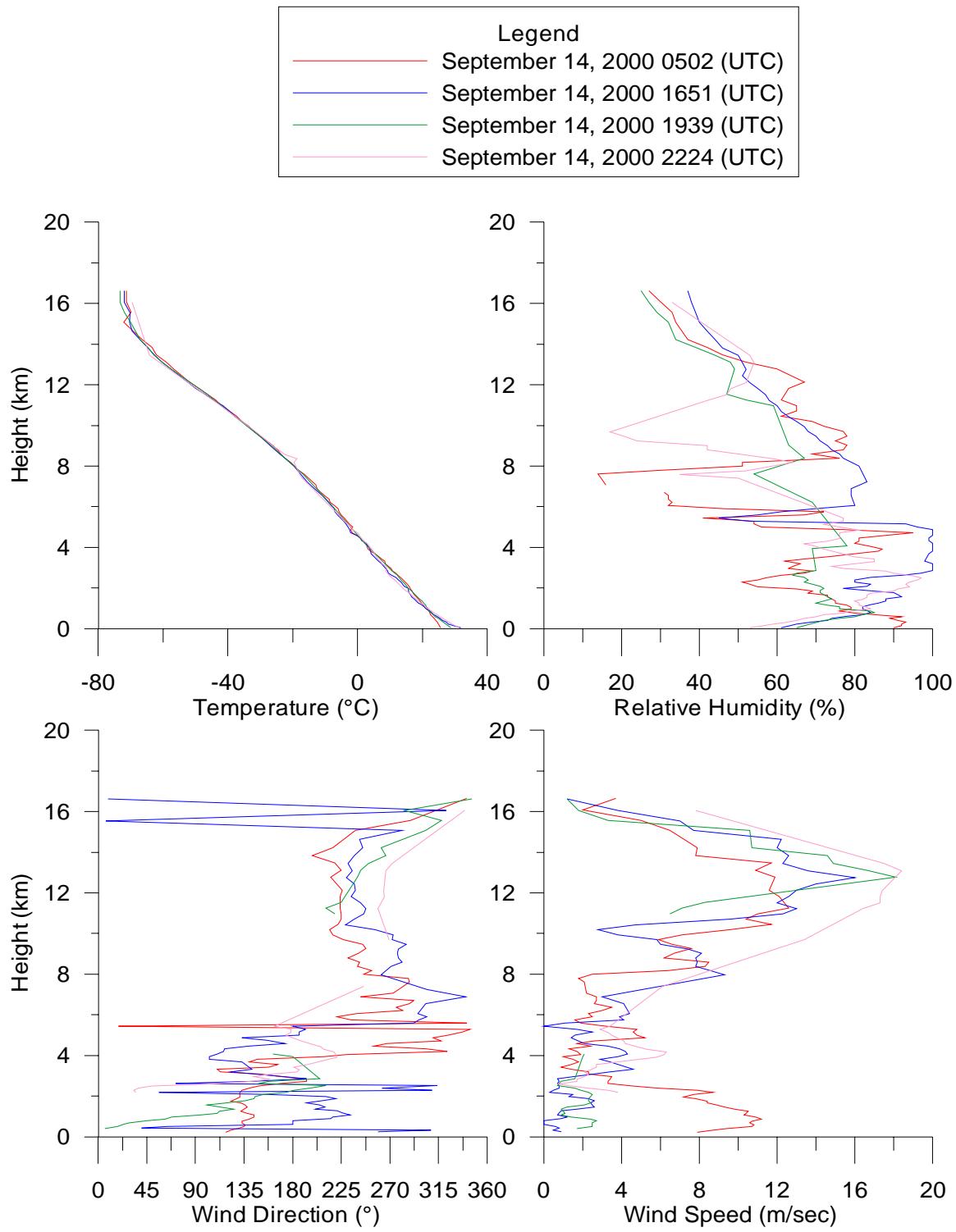
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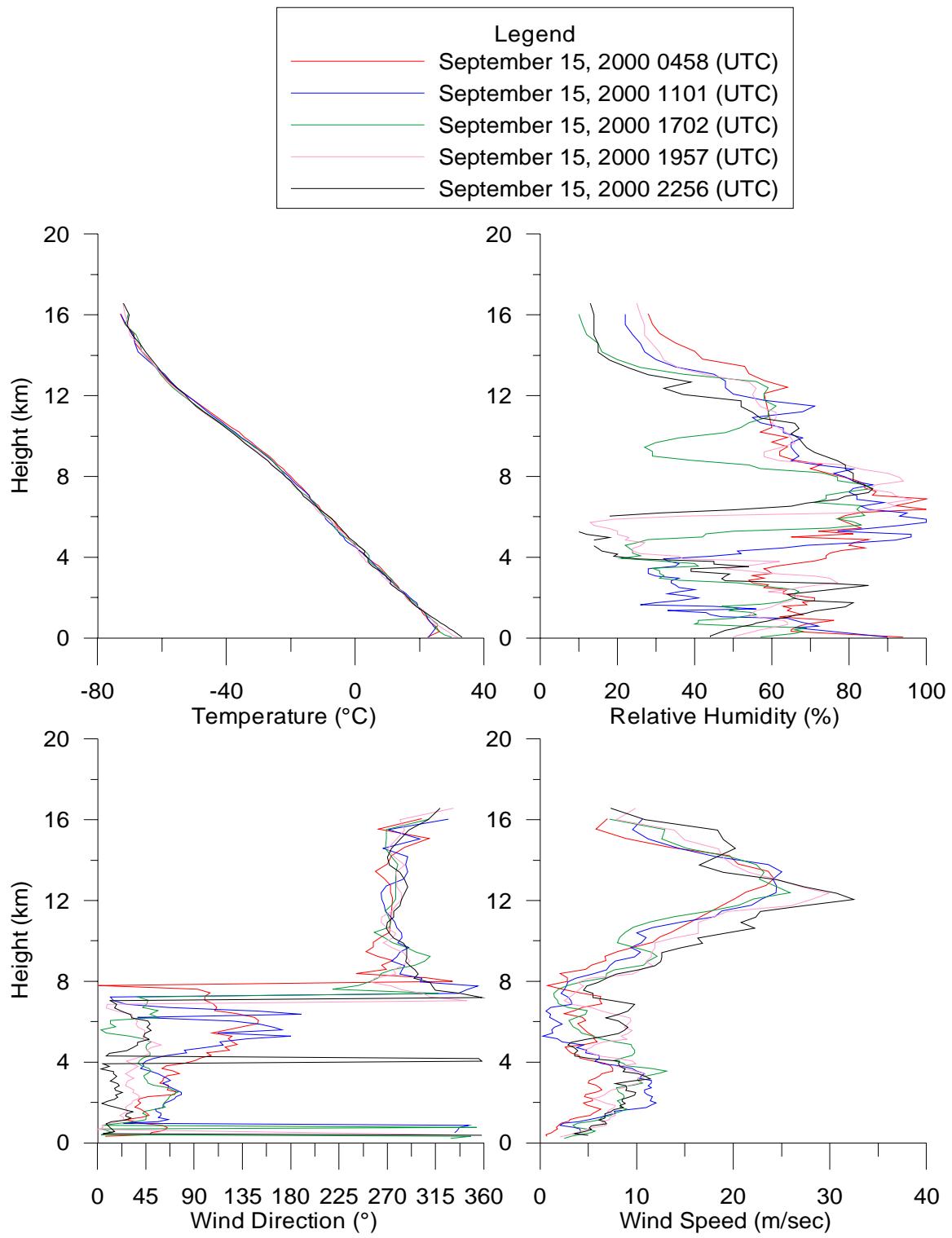
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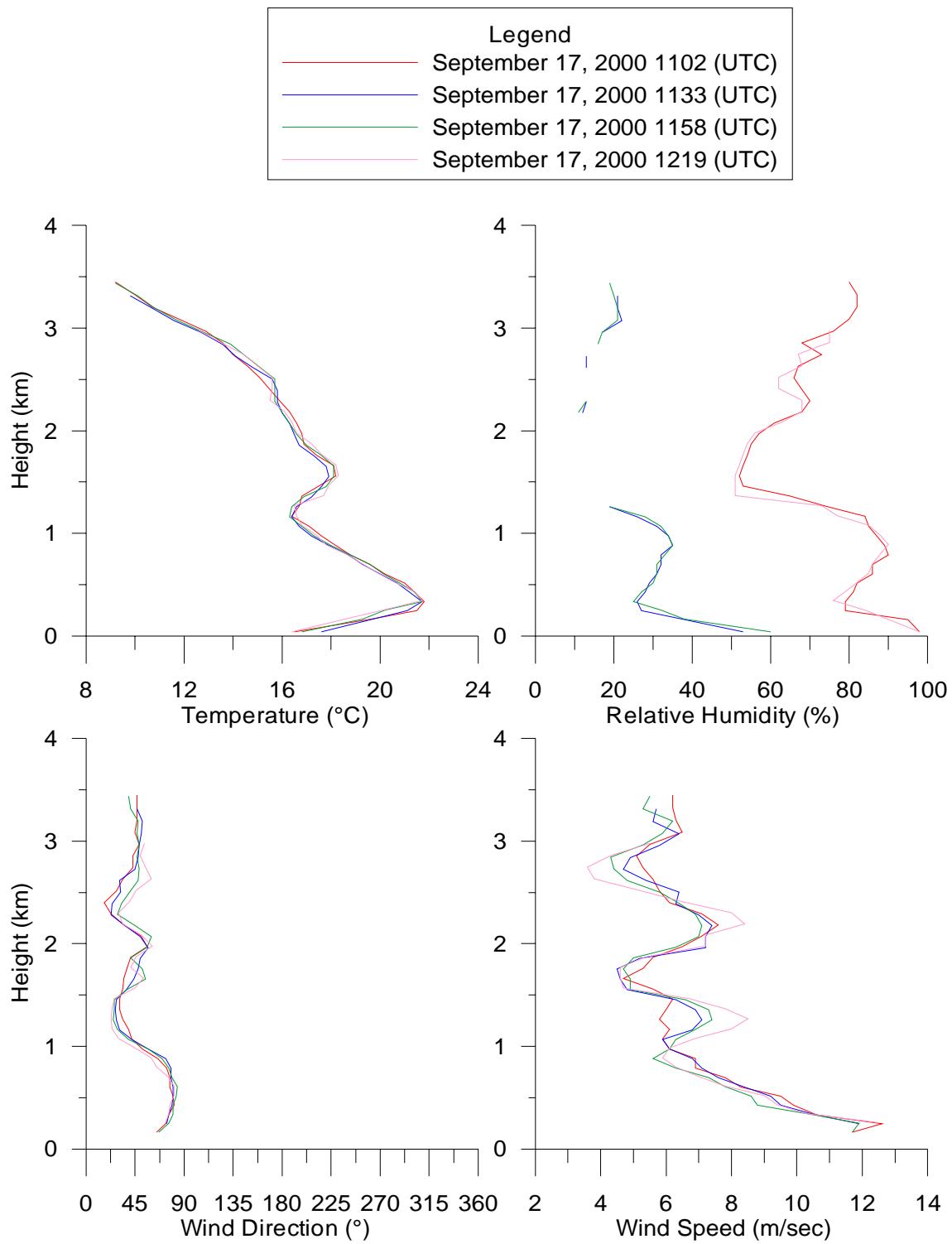
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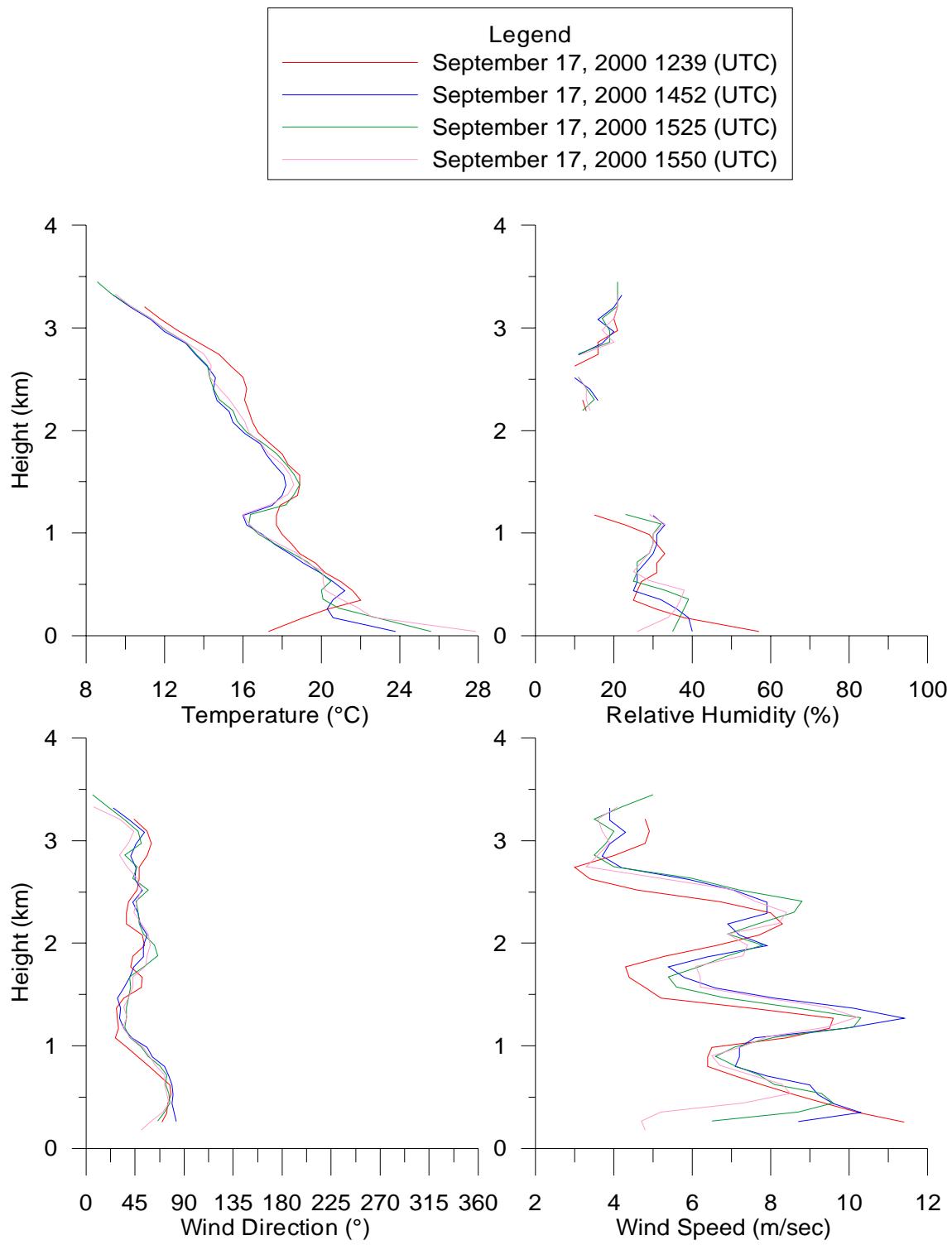
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La Porte Municipal Airport, La Porte, Texas



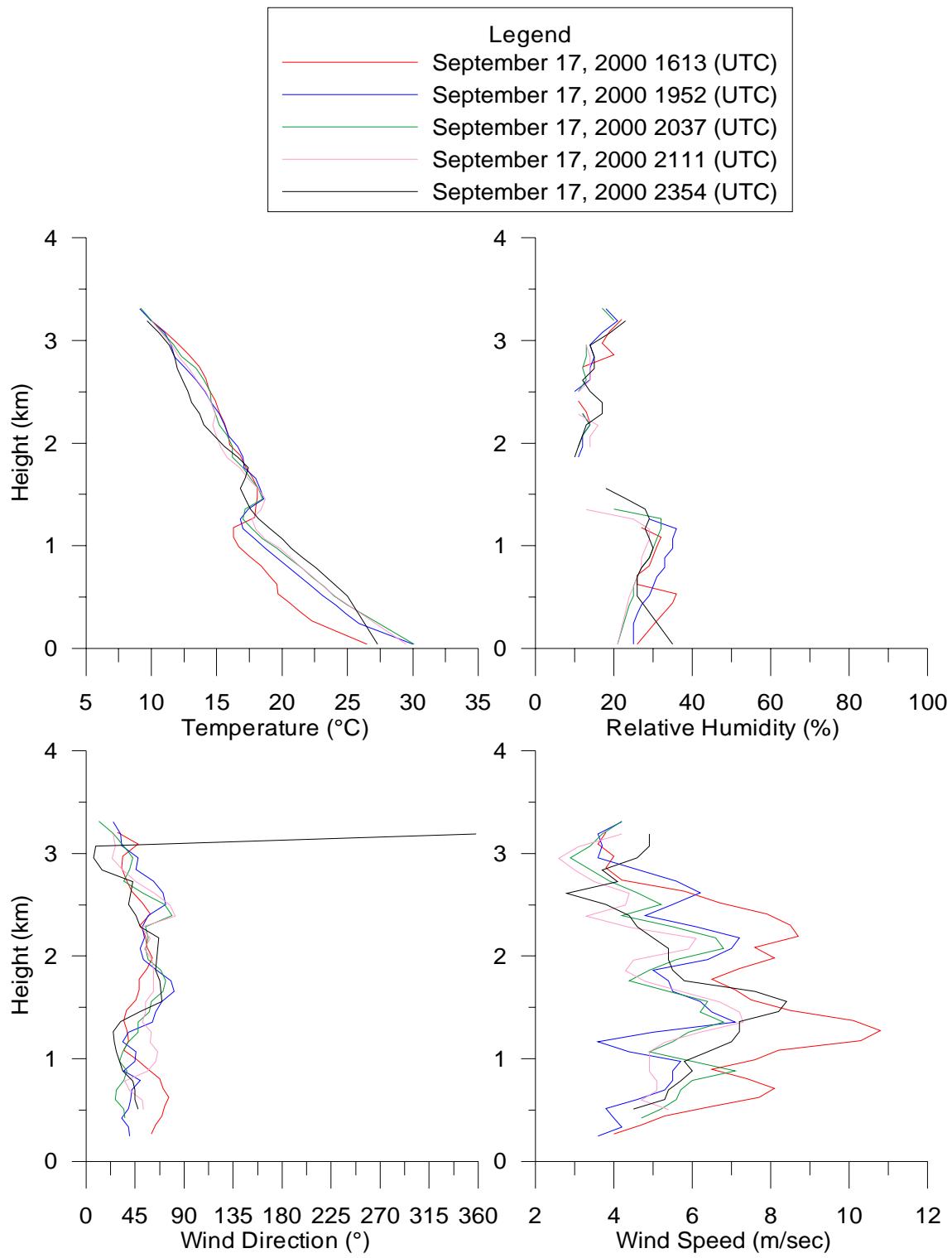
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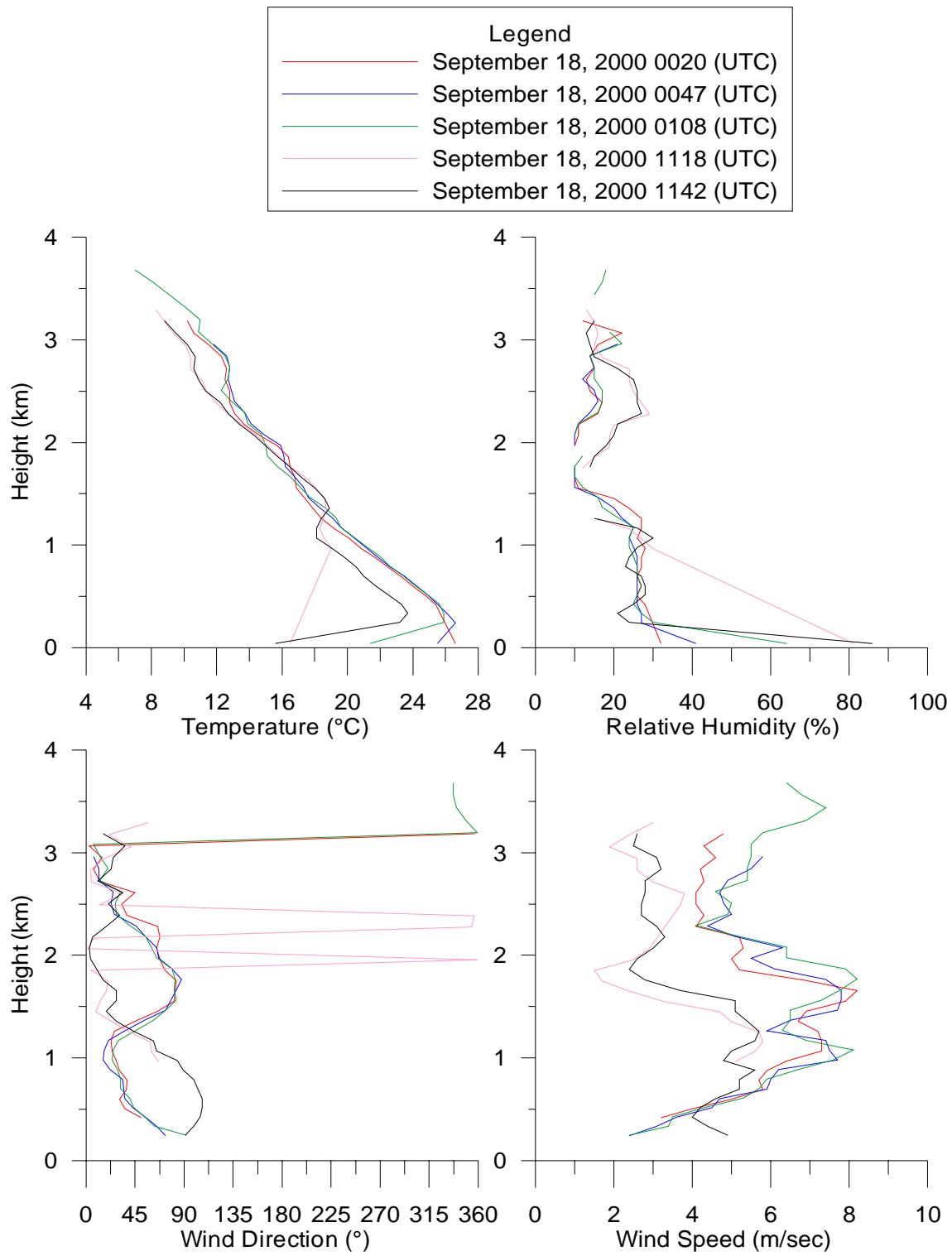
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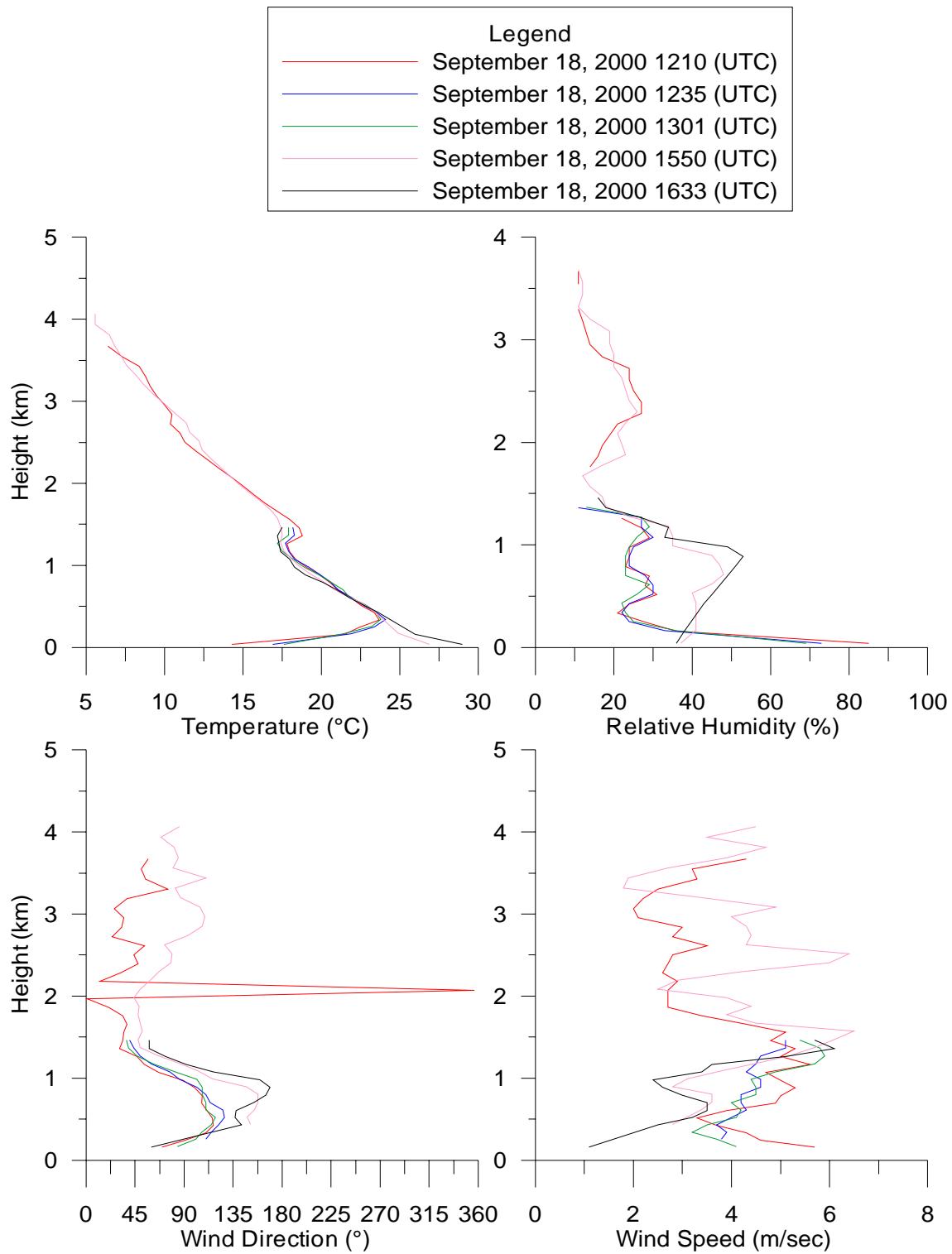
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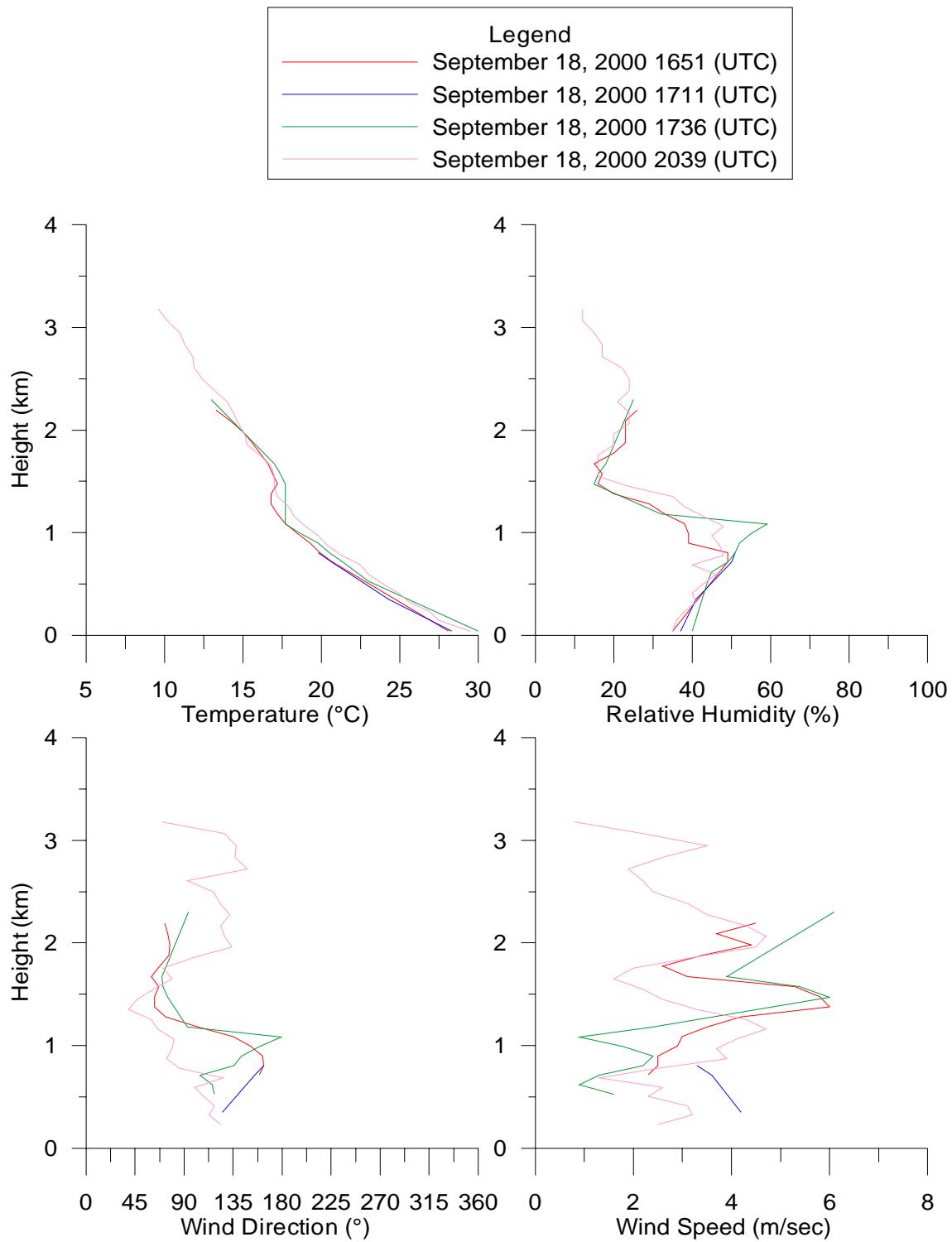
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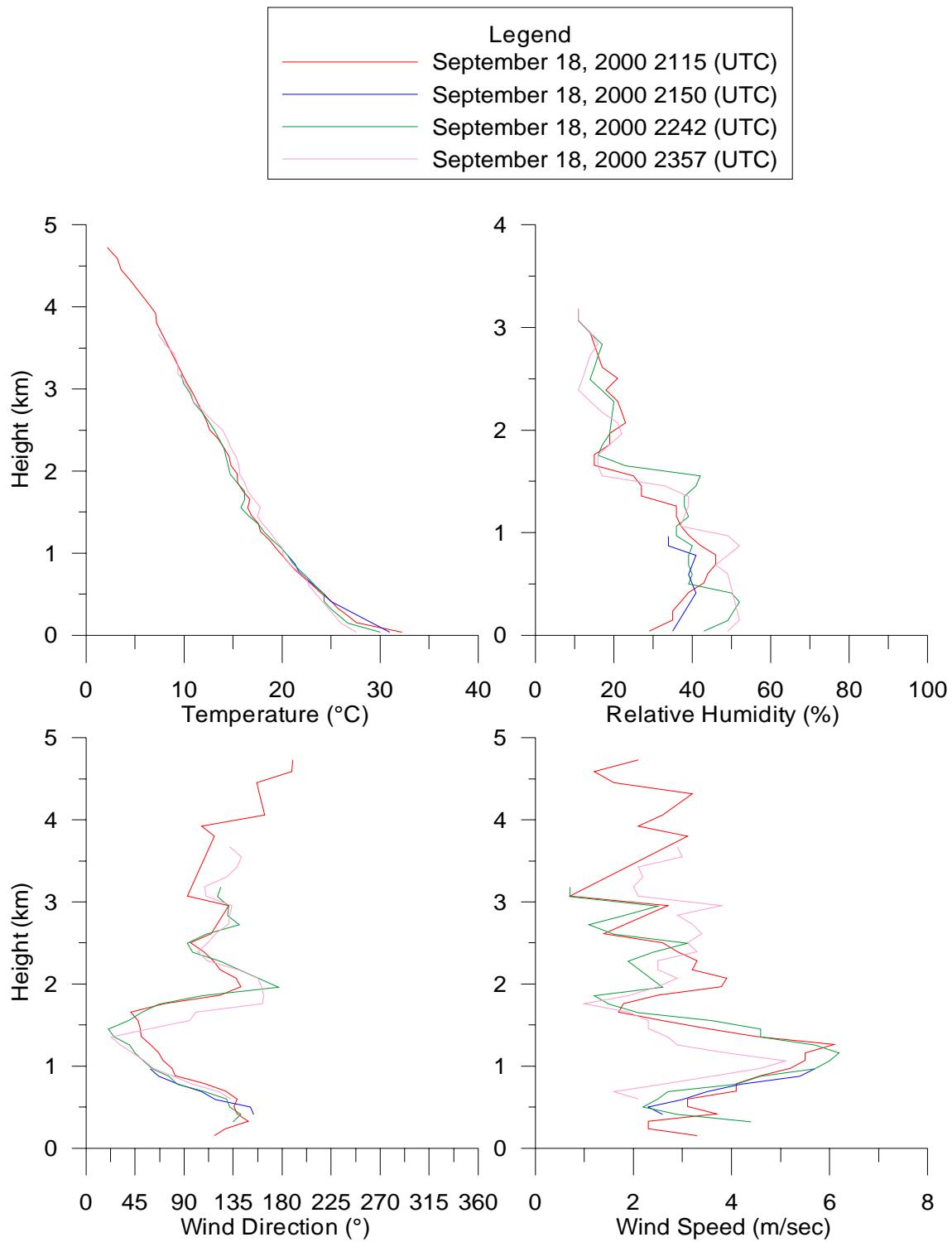
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